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FLOOD PLAIN MANAGEMENT AND PROTECTION



SUSQUEHANNA RIVER BASIN COMMISSION
QUARTERLY MEETING NO. 1
JULY 10, 1975

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INTRODUCTION

This report will serve as the official record of the Susquehanna River Basin Commission's First Quarterly Meeting held July 10, 1975, at the Penn Harris Motor Inn in Camp Hill, Pennsylvania.

The day-long meeting addressed the topic of Flood Plain Management and Protection in the Susquehanna River Basin. Key personnel from Federal and state agencies as well as the SRBC staff briefed the Commission and public in attendance on their present and future programs in the topic area. The Commission also presented a list of needs it believes are vital if a sound program of flood plain management and protection is to be established basinwide. The needs presented were: delineation of flood plain areas, basin-wide mix of structural and nonstructural measures to reduce flood damages, regulation of flood plain use, expansion and improvement of the flood forecasting and warning system, and emergency measures to save lives and property in the event of a flood.

Following the presentations, a brief assessment was made regarding the adequacy of ongoing programs to meet the identified needs.

This report also contains a complete transcript of the proceedings including questions and comments from the audience and responses by speakers, Commissioners and staff.

It is the intent of the Commission that this meeting provide the basis for establishing understanding of the common flood hazards faced by residents and businesses of the Basin, and to emphasize the urgency of charting a course of action to effectively reduce damages from future floods such as Agnes which occurred in the Basin a little over three years ago.

ALTERNATES AND ADVISORS
PRESENT AT
FIRST QUARTERLY MEETING

NEW YORK

Dr. Theodore L. Hullar, Alternate for
Governor Hugh L. Carey

Dr. David Allee, New York Advisor

PENNSYLVANIA

Dr. Maurice K. Goddard, Alternate for
Governor Milton J. Shapp

MARYLAND

Mr. Paul McKee, Alternate for
Governor Marvin Mandel

Dr. Albert R. Miller, Maryland Advisor

FEDERAL

Mr. Thomas C. H. Webster, Alternate for
Federal Member

Mr. Frank Masland, Federal Advisor

A G E N D A

INTRODUCTION.....	Robert J. Bielo Executive Director SRBC
MAPPING.....	Mary Ellen Barnes SRBC Staff
Speaker.....	Walter Pierson Regional Flood Insurance Specialist, HUD-FIA Philadelphia, Penna.
OPTIMUM MIX OF STRUCTURAL AND NONSTRUCTURAL MEASURES.....	Marshall Goulding SRBC Staff
Speaker.....	Col. Robert S. McGarry District Engineer Baltimore District C.O.E. Baltimore, Maryland
REGULATIONS.....	Rosemary McLeod SRBC Staff
Speaker.....	Keith Muckleston Water Resources Council Washington, D. C.
FLOOD FORECASTING AND WARNING.....	Wayne DeMoss SRBC Staff
Speaker.....	Allen F. Flanders, Asst. for National and International Affairs, U.S. Dept. of Commerce National Weather Service Silver Springs, Maryland
EMERGENCY MEASURES.....	Mary Ellen Barnes SRBC Staff
Speaker.....	John Bex, Director of Region II Defense Civil Preparedness Agency Olney, Maryland
SUMMARY.....	Robert J. Bielo Executive Director SRBC Staff

Opening Remarks - (Dr. Maurice K. Goddard)

I am glad to see such a large public response to this type of new program. We are going to try to run through until 12:00, then adjourn for about an hour and a half so we can all get lunch, come back and try to complete our discussion by about 4:00 p.m. at the latest.

The proposal is to have an Introduction by our Executive Director and then introduce the various speakers. We will have questions and answers following the speakers' presentations. To introduce the program, I will introduce Mr. Bielo, our Executive Director. Bob.

Introduction - (Robert J. Bielo)

Thank you, Dr. Goddard.

The intent of the Quarterly Meeting Plan is to focus attention on a broad area of public and Commission concern in the basin. The topic chosen for this First Quarterly Meeting is Flood Plain Management and Protection. Without going into detail to defend this choice, let me note that there are over 1,000 communities, large and small, in the basin that suffer some degree of hazard from floods. The frequency of flooding for many of these communities is as often as once every ten years and in some cases less.

Our topic for today, Flood Plain Management and Protection, is one of six program areas described in the Commission's Comprehensive Plan. Within this topic area the staff has determined five areas of need: flood plain mapping, basin-wide mix of structural and nonstructural measures to reduce flood damages, regulation of flood plain use, expansion of the flood forecasting system and emergency measures to save lives and property in the event of a flood.

The format for today's program will be as follows:

1. An area of need will be identified.
2. A representative of an appropriate agency will discuss the major ongoing programs to meet the need.
3. A general assessment will then be given regarding the adequacy of the ongoing programs to meet the need.
4. Following will be a brief period of general discussion by Commissioners and invited speakers.

The next area of need will be introduced and the routine just described will be repeated.

Comments from the audience will be recognized during each discussion period. Due to time limitations, however, written statements may be submitted over a 30-day period regarding any aspect of the overall program.

Introduction to Needs - (Robert J. Bielo)

A comprehensive approach to Flood Plain Management is needed if we are to effectively reduce damages from future floods. The ever increasing damages from flood events have clearly indicated the historic single measure approach to reducing damages is inadequate. The five areas of need expressed earlier all must be addressed in a coordinated plan if we are to achieve, for this basin, a comprehensive flood damage reduction program.

In listing the five basic needs in the area of today's topic, we recognize others may have different opinions and certainly will have in mind many areas of specific, local flood protection need. We want to hear these opinions; but we would point out that we are considering, for this first effort, only the very basic, basinwide needs as they relate to the objective of reducing damages from future floods and making the basin a safer place in which to live and work.

The Flood Plain Management and Protection needs as expressed here are based on preliminary quantitative and/or qualitative assessments of various aspects of the flood hazard problems and ongoing damage reduction programs.

With that brief introduction of the five topics, I would ask the first speaker from our staff, Miss Mary Ellen Barnes, to introduce the first need, which will be flood plain mapping or identification of the flood hazard areas of the basin. So, Miss Barnes, would you please come forward. I might say this young lady is going to leave us and go back to the University of Pennsylvania.

Flood Plain Mapping - (Mary Ellen Barnes)

Need

The first need is for the mapping of the Basin's rivers and streams in sufficient detail to adequately delineate the 100-year flood plain for future management purposes.

To date, 1,311 flood prone communities have been tentatively identified in the Susquehanna River Basin. Of these, 606 are eligible for the National Flood Insurance Emergency Program.

At present, only communities which are eligible under the emergency program are included in contracts for final flood insurance studies.

The development of high quality mapping is crucial to any flood plain management strategy. It provides the basis for accurate floodway and floodway fringe determinations from which insurance rate maps for the National Flood Insurance Program are produced.

Mapping can be utilized as a general tool for planning activities to steer future development away from flood hazard areas. Detailed mapping will assist communities in their formulation of flood plain regulations and will serve to provide important hydraulic base data which was previously unavailable.

Mapping will aid municipal government in planning local land uses in the flood plain and will guide selection of the type and style of structures and/or floodproofing that will be necessary in that area so that flood damage will be minimized.

Flood insurance maps will provide an accurate basis for determining flood damage reduction benefits accruing to structural and nonstructural projects.

It is important to keep in mind the need to update the mapping, especially in locations where rapid development on flood plains is allowed to continue and where established flood elevations may be altered. Unregulated flood plain development may change the frequency of future flooding events in individual communities. Thus, the 10-year or 50-year flood may become a more frequent event.

Before introducing the HUD-FIA representative to discuss the ongoing mapping program, it seems worth repeating that detailed flood plain maps are essential, basic parts

of a comprehensive flood damage reduction program.

At this time I would like to introduce Walt Pierson, who is the Consultation Coordination Officer working out of the Philadelphia Office of the Federal Insurance Administration.

Flood Plain Mapping - (Walter Pierson)

Presentation

Thank you, it is really a pleasure to be here this morning. I look around and see a lot of people that I do business with and know the group that are here from Lock Haven. I run into them everywhere I go, I do not know what the secret is but it is good to have them here. I am a CCO, Consultation Coordination Officer, which is a part of my job. I am really the Director of the Office of Flood Insurance for HUD, Region 3.

I do want to talk about our mapping program. I want to talk a little about the three approaches to flood plain management before I get into the mapping program, as many of you folks here are conversant with flood plain management. I do want to touch on what we feel are the three approaches to flood plain management and of the three facets. Number one is emergency preparedness. I might say that this is the most important of the three. Second is physical protective works and the third being land use control. Why I say emergency preparedness is so important is that, I think, we take it for granted. We had a real good example of how effective emergency preparedness can be pre-disaster and I am not even talking post-disaster.

In Corpus Christi in 1919 they had a hurricane, I do not think they named them at that time, but a terrible hurricane blew in from the Gulf causing high winds and water and 600 people lost their lives. Then in 1970 Hurricane Celia hit Corpus Christi and the surrounding area. There was adequate warning and this is, of course, due to advancement in technology as well as emergency preparedness. There were 13 lives lost, which is too many, but it gives you an idea of how effective that early warning system was to reduce a large number of lives in 1919 down to a relatively small number in 1970. It is kind of interesting to track hurricanes. In the business I am in I track anything that has to do with rain or bad weather. Hurricane Celia took a bee line right across the Gulf at Corpus for three or four days; it did not veer, it just snapped right into the city. The Civil Defense did a

tremendous job of evacuating the people from that area.

The second facet that we are all familiar with is the physical protective works that the Corps of Engineers has been heavily involved with, as has SCS and the Bureau of Reclamation. I am sure there are some other State agencies, I probably missed somebody, but there are different agencies that construct very essential flood protection devices such as dams, dikes, levees, channel widening, deepening, lining projects, retention basins and other projects. There are structures that are built and we receive benefits from every day as they give protection to our homes and properties. Probably the major problem with this type of protective device is that there is not enough money to protect everybody that needs it. This is a very big problem. I do not know how much it will cost to protect the 20,000 plus flood prone communities in the United States, but it would be up in the trillions of dollars and we are just not in an era when we can spend or get that kind of money. If we could get it, delays that are involved environmentally and otherwise are very time consuming. This would be the second concept of flood plain management.

The third facet that I am leading into is land use control on which the flood insurance program is based. In the past the feeling was a competitive thing, the structural versus the nonstructural. I think that day is over, too. It is a complimentary thing and we all have to work together. All three facets of flood plain management must work together because none of them can stand alone. We are gearing our program, and I know the Corps has specifically geared their programs, to having all the approaches go together within each district office. In the Corps of Engineers you will find flood plain management services groups that do a job more along the non-structural line in producing flood plain information studies which you have seen and which are very helpful in the communities that have been using them for years. They are also heavily involved in our program of flood plain insurance rate studies and all the districts in this region are doing work for us. So the Corps is geared up to do this.

They also give advisory services to communities in the region. I am sure a lot of your communities have used their services. We are not in competition by any means and I hope nobody thinks we are as we are all trying to reach the same objectives. As a matter of fact, when I was down in Richmond about a year ago there was a proposal presented for the protection of the City of Richmond. They have some rather serious flood problems.

They are very much aware of them. They got hit by Hurricane Camile in 1969 and were hit again in 1972 by Tropical Storm Agnes. They also had an 8 million dollar suit against the City because they were not in the flood insurance program; however, they have since come into the program and I do not know the outcome of the suit.

There were 27 proposals for protecting the City of Richmond that the Corps of Engineers presented and it was really interesting to note that a number of the alternatives called for a combination of physical protective works plus flood insurance. They were more or less saying there were some areas they were going to protect and other areas they just could not protect within financial feasibility and they recommended they combine the physical with the flood insurance program and that was the first I had heard of this and thought it was a sound proposal. I do not know which alternative, if any, has been decided upon. We are working together and I want to make that point. I also want to point out briefly why we are in this business. Why is the Federal government in the insurance business? I want to give a little background on that because it also can do away with some misconceptions. Prior to 1968, there really was no flood insurance available that people could afford. You could get it. There were a number of companies in and out of business but it was a dead loser, so they got out of it permanently. A few companies stayed in business, one being the Lloyds of London. As I pointed out, this firm stayed in business and took such high risk ventures at high premiums that people could not generally afford the insurance. Thus, there was really no flood insurance available.

The Congress passed the flood insurance act in 1956 which they did not fund. It languished until 1968 when the present act was passed and funded and at that point the government, HUD, which still has the responsibility for the program, decided they wanted the insurance industry involved because they have a tremendous sales arm with thousands and thousands of insurance brokers. This was a logical way to market this item as they also can service it well as far as losses go because of the adjustment angle. At that time the insurance industry was not red hot on this proposition and they did not want to get into it because they felt it was a government give-away operation, and asked why have a middle man, why not just issue our own checks. This did slow things down and we reached a happy compromise. In insurance you have to realize there is always a risk reduction loss prevention program. I love that term, I picked it up down in West Virginia last year. If you want fire insurance on a

brick house in a city and the house happens to be near a fire hydrant, the rate is a lot less than a man that has a frame house with an asphalt shingle roof out in the country where there is a volunteer fire department and no fire hydrant. This is underwriting and is the way they come up with the rates. You are going to pay a lot more out there in the country than you would in that brick house in the city. It is true that if you are a lucky driver or you have a good record your rate can be less than your rate if you have a poor record. Every insurance line has this, so the insurance industry was saying to us, if we cannot reduce our losses we can never be self-sustaining. Well this, at the same time, was coming together with the land use angle and it worked in very well as we figured the land use is that risk reduction loss prevention feature. The insurance industry came into our program at that time when they saw there was a land use companion to it because they feel, and George Bernstein who is no longer with the department, has always felt, that this program some day will be self-sustaining. We are talking long term, maybe 15 to 20 years, but some day the insurance angle should not have to be subsidized. This may be a long way off but this is what the land use is all about. The insurance industry happily is in it with us. We hope that we can maintain the land use portion of the program because that is the only way we have of keeping the insurance industry. They are terrific to work with. I have to work with four servicing companies in this region. They are very responsive. They handle the sales very well. The other angle is the servicing which I feel is very important. I have some good examples. My best one was down in Logan County, West Virginia last year. I was there for another matter, but they had a small flood in January 1974 and the fellow I was dealing with had a check in his pocket for flood insurance damages. He had a small business which had been damaged in the amount of \$3,000. This was less than a month later, and I do not mean to cast any aspersions but no level of government, be it local, state or Federal, reacts that fast. They just do not do it but here was a man who had his claim adjusted and was paid in less than a month. This is terrific and we are glad to be that responsive. Also the individual that has the loss never had to deal with a government employee. He deals strictly with the agent that he always deals with for any line of insurance whether he is buying the policy or he is adjusting the loss. I think this has its benefits, too.

Now I am leading up to the mapping, I am getting to it a little slowly, but it all comes into how do we make the land use portion work. The land use portion is the hot issue in the flood insurance program right now. There

are now several bills in Congress to try to reduce or change it. We are going through a regulation change today; matter of fact, I want to apologize that Mr. Hunter, our administrator, would have liked to have been here today but he is on a round of public hearings throughout the United States. I think they are in Chicago today and they will be concluding one in New York next Monday if anyone wishes to go visit. These are hearings on our new proposed regulations. But anyway we have had problems with land use. We are trying to work it out so that people can live with this. We feel we are being successful, as the concept is catching on. Two years ago all of it was resistance, but now the tide is turning, it is going the other way, it is amazing, it is unbelievable because I get calls every day now from builders and other people involved. They cannot get permits to build on flood plains and I think we are seeing communities now going to almost the opposite side. They are overacting. We are trying to get to a point where everybody understands what the situation is and what we are really after in this flood plain management option. This is a different aspect from two years ago when the communities did not want to have any part of the studies. A lot of communities we go into, they really do not react that much to the insurance. That is fine - we are going to double the coverages, but give us those maps. That is what we want so we can regulate when we have to go to court we have something to stand on. We need those delineations. That is what they are after. Not the double coverage. I hardly ever have a call to say we need more coverage. It is, we need that delineation. This is amazing. Not only in Pennsylvania where we have always had a good reaction, particularly in eastern Pennsylvania, but also in West Virginia. We have counties down there that never even had building permits up until a year ago. They are regulating in this area excessively in some cases. They will cool off, it is really a change and we are seeing the fruits of the whole thing.

Now as far as the mapping goes, we have around 450 studies under contract in the State of Pennsylvania today. We are working pretty heavily with the SRBC on over 200 studies. The DRBC has a fair number, Corps of Engineers is working out of three different districts in the State of Pennsylvania. There are a lot of flood insurance rate studies going on today. We are working on a program for FY-76 right now which will bring even more studies, but we have over 1,200 communities in the program in the state for which we must produce a study for each one. They must be produced in 1983 according to what the Congress said to us, so the 450 we feel good

about is more than any state in the union by far. In fact, the enrollment is more than any state in the union. The State of New York is second with around 500 communities. I see some people here from DCA and the State of Pennsylvania who deserve all of the credit for they have done a tremendous job in the enrollment and nobody can touch them in the United States, and I want to give them that acknowledgement. We have a long way to go with this mapping. The SRBC got in early, we are finishing up the mapping for 122 studies in the Basin that we are trying to have final meetings on and we are half finished, my fellows tell me. We have special flood hazard boundary maps for over 2,000 communities. These are the rough early maps based on the best available information. In most cases, they are USGS or flood prone and sheets. They are out to over 2,000 communities throughout the State of Pennsylvania. I cannot talk Basin, I have to talk state because I do not have figures for the Basin. A lot of those are under appeal, a lot of the communities have reacted violently almost to those maps and we are straightening them out now. We have a Pennsylvania firm, Gannett, Fleming, Corddry and Carpenter, working on these maps and you will see them revised. These are the initial maps that bankers are using to require flood insurance. They are also the initial maps that the communities are using for rough land use purposes. I mean rough, a good number of our communities in Pennsylvania have better information. They have FPI studies from the Corps, they have soil maps from SCS, they have locally prepared flood studies, they use them in their own communities certainly, but the community that has nothing, maybe this is a good flag that may help them to identify areas where they do have problems. These are our first maps, we are pretty near done issuing them.

The second maps that we have shown you are a lot more definitive. They give delineation for the 100-year floodway. Another map gives you zones for insurance purposes. Within the body of the study that we produce, we give you the profiles for the 10-year, 50-year, 100-year and 500-year floods. It is quite a comprehensive study when it is completed. We are getting a good reaction to those studies almost everywhere we go. This is what we need. We are talking about needs this morning and this is probably the basic need for every community because this is a local program. The land use control measures are not Federal regulations; the actual enforcement is at the local level, the boroughs, townships and cities. So that this is a locally enforced program based on local regulations. We assist communities to come up with ordinances but we do not have any ordinances which we particularly espouse. We like the community to come up with their own and there are some good examples around the state. I point again to Lock Haven. They have some

good ordinances on the books so that this is what those communities need to operate. They need some good data behind them because it does not behoove them to come out with a tight ordinance if they do not have the scientific data behind it to go to court with if they have to. This is our number one need, we are working on it. I know the other agencies are also working on it with flood studies. We would like to accelerate the program, we are getting a lot more money this year. Each year we have been almost doubling the amount of money available for flood insurance rate studies. It went from 46 million in FY-75 and we think it is going to about 60 million in FY-76. I have a couple of other comments that I would like to mention to the Basin Commission. I believe there are a couple of things we need and you are maybe working on this already, so I will just throw it out for what it is worth. I think we need some thought to common flows for the streams in the basin, particularly your main stems so that all these agencies and consultants that are doing studies can have some common basis, even if you agree on some kind of common methodologies or guideline flows, or minimums or maximums or what have you. I think this is very important because we are going to end up with a patchwork of studies if we do not have some good coordination. It is in our FIA contracts, that the study contractor must coordinate with everybody else that is doing studies. I am leary of what is going to happen when we get an awful lot of studies. We are going to have some real conflicts and we are going to have a lot of trouble mediating these. I am already getting involved in this so I hope the Basin Commission is giving some thought to setting up common flows or some guidelines for flows in the Basin.

Also currently, I have been appointed by the Commissioner of the DRBC to serve on a flood plain management regulation advisory committee and we have been meeting in Trenton for six months to come up with policy, regulations, procedures which DRBC will come out with eventually on flood plain management within the Basin. They have good representation from the states. Right now I am the only Federal representative. There was a man from the Department of Agriculture but he was transferred. We are near the end. We are going, I think, to be able to give their recommendations to the Commission in August and they will of course make their own decisions on which way they want to go. This is another thing I think the SRBC should consider, maybe you are already doing this and if I am out of order I apologize but I think that we should be looking basin-wide to flood plain management because a community may do an excellent job but if their neighbors upstream, down-

stream and across stream do not, or do detrimental things, we are losing the battle rather than winning it. So I think a basinwide approach would be very helpful. Maynard Long from our Washington office is here and one of his jobs is to work with the Basin Commission and the consultants in the flood insurance rate mapping studies. He was nice enough to come up here today and handle some of the heavy questions because they do all of the contracting out of Washington. I think with that I would like to conclude the formal remarks I have and would be glad to go along with questions.

Comment - (Dr. Maurice K. Goddard)

Stay right here, Mr. Pierson, because there might be some questions. Dr. Hullar has a question.

Comment - (Mr. Robert J. Bielo)

Can we have Mary Ellen provide the assessment before we go into questions?

Comment - (Dr. Maurice K. Goddard)

Was there another presentation?

Comment - (Mr. Robert J. Bielo)

We would like to summarize the mapping situation briefly as we see it based on what we have heard from HUD, from what others are doing and where it looks like we are going in this area.

Flood Plain Mapping - (Mary Ellen Barnes)

Assessment

I think Mr. Pierson has made an excellent case for the use of the combination of measures including structural and nonstructural measures. In doing so, he has also identified a few areas that we are going to want to discuss including problems with the implementation at the local level of land use requirements, the need for basinwide approach to flood plain management and the coordination of these efforts.

The current HUD-FIA program that has just been described provides the opportunity to obtain highly accurate and uniform delineations of various frequency flood lines for communities throughout the basin. The maps that have been produced for this basin are sufficiently accurate in terms of planimetric details, contour elevations and flood lines to enable the formulation and implementation by local government of zoning ordinances, as necessary, to meet the insurance requirements. The high level of detail also makes the maps suitable for a wide array of other planning, development and regulatory purposes. Continuation of highly accurate and detailed mapping as part of the FIA program is essential if it is to be fully effective.

Experience has shown we cannot rely on small scale maps, such as USGS quad sheets or maps of low contour and planimetric accuracy for the plotting of flood profiles which are developed through complex hydrologic computations.

Important features of this program to consider are the current and future level of funding, rate of completion of mapping studies and the implementation of HUD-FIA land use requirements by local government to assure the insurance remains in effect.

In this Basin, of the 1,311 municipalities or parts thereof that are flood prone, 606 are eligible for the National Flood Insurance Program. Two hundred and forty-six will be mapped under current contracts between SRBC and HUD-FIA. Federal agencies have completed or have underway flood insurance studies for four additional municipalities. The remaining 356 eligible and some 705 municipalities not in the program have not been scheduled for study.

The potential decline in the level of available funding for studies in the Susquehanna Basin for fiscal year 1976 will delay the completion of basinwide flood plain mapping. Even at the present funding and study completion rate, it is estimated that it would take over 10 more years to map all flood prone areas in the Basin. This seems an unacceptable rate of accomplishment.

The potential reduction of study funding levels in this Basin, the possible reduction of the quality of mapping to be produced, the number of communities not included in the program and the limited assistance available to communities to interpret the insurance studies and to help prepare satisfactory zoning ordinances are serious limiting factors that must be overcome if we are to achieve a comprehensive flood damage reduction program.

I think some of the issues you might want to discuss right now would be problems and the implementation of land use controls and long-term implications of the flood insurance and mapping programs for the Basin's communities and for the water resources agencies.

Comment - (Dr. Maurice K. Goddard)

Thank you, Mary Ellen. Now, Doctor, I am sorry.

Question - (Dr. Theodore L. Hullar)

I have a question about the coordination aspect you brought up at the very end. We have an associate here today, Frank Dwyer, who has been extensively involved in New York State's program. A question we have is, are we going to get the standardization we need of a data base if a consultant is working in several communities scattered around a rather large Basin doing this kind of work with his kind of methodology and then a state such as New York comes in with its work and possibly uses a different methodology. First of all, the first question would be, what are you doing to insure that the basis of evaluation is the same and what in fact do you see as the role of the states or of SRBC in an overview of these studies?

Answer - (Mr. Walter Pierson)

Okay, the first part, if you have seen the agreement from our standard contract, it calls for coordination with all studies in the immediate area. I believe that this is one of the things that maybe we do not have quite enough experience with to know how effective it is. It is explicit, however, that every study contractor or agency make their study more or less fit in or reconcile with any adjacent studies. If they cannot do this, it is incumbent on them to tell us why.

Comment - (Dr. Theodore L. Hullar)

It would seem that would not necessarily be adequate because a state is going to be there for a long time and a contractor is going to be leaving after he does his studies. I would suggest an approach requiring the contractor to use a data base which is identical to that adopted by the state so that the ongoing programs will all have the same data base.

Question - (Thomas C. H. Webster)

If I might interrupt, isn't this one purpose of our hydrology coordinating committee?

Answer - (Robert J. Bielo)

In our contracts the SRBC is required to reconcile all of the hydrology and hydraulic work. We do the hydrology in our office and coordinate it with the Corps, SCS, USGS and the states. With the extensive coordination there is little question about the methodology and the acceptability of the final results. We have a hydrology coordinating committee that includes the agencies that deal with hydraulic and hydrology problems. The group works out technical differences at the staff level to the extent possible, and policy differences are to be referred to higher authority. When we have completed our studies in the Basin there will be uniform hydrology for anyone or agency to apply to any particular problem. The overall effort is one of continuing coordination among the several agencies, all of whom have been of tremendous assistance.

Comment - (Dr. Theodore L. Hullar)

I think that is very good, thank you.

Comment - (Dr. Maurice K. Goddard)

I think we ought to talk briefly on how we can speed up the mapping program. It looks as though our general assembly after several years in debate, will pass Senate Bill One. As you know it passed the Senate, we had a three-hour debate on flood plain legislation before the conservation committee earlier this week. They added some funds to the bill for local government. I do not think we will spend that much money the first year but we are going to have to get this mapping done in order to do what Senate Bill One requires. I do not know whether anyone here has suggestions as to how we can get more state funds or local funds or some other type of financing to get the mapping moving faster, because we are going to have floods in the next ten years and a lot of people are going to be flooded in that time. Of course this may not stop them from being flooded but it may prohibit new construction that we know is going to be flooded. Anybody want to try to talk on that point? I think we have to worry about it. Any other questions? That is my big question, I got my chart all

mapped up with that problem. If not, we can come back to points, but time is running along pretty rapidly and I think it would be better perhaps to get along with the other subject items, then we can always come back at the end of the day. Thank you, Mr. Pierson. Mary Ellen, good summary.

The next item is Optimum Mix of Structural and Nonstructural Measures. I finally got on to the technique, Marshall Goulding will present this item, Marshall.

Comment - (Marshall Goulding)

For a while I thought Walt was going to carry us through the rest of our morning program when he mentioned the other considerations we should take account of in looking at the overall problems of flood plain protection and flood plain management.

Optimum Mix of Structural and Nonstructural Measures - (Marshall Goulding)

Need

The second need is for the determination of an optimum basinwide mix of structural and nonstructural flood damage reduction measures. No one measure, or even a combination of measures, will provide one hundred percent flood protection. What we seek is a set of measures which reduce the repeated and increasing economic and social burdens suffered in the Basin due to flooding. These measures should offer flexibility in the kind of responses which individuals and groups can make to the flood hazard.

A determination of this mix should consider a variety of measures: dams, levees, channel work, relocation, flood-proofing, land use regulation, acquisition of flood prone lands, flood insurance, flood forecasting and warning, and emergency evacuation measures. There are other measures whose applicability to flood plain management and protection has yet to be fully tested but which may prove to be useful, such as compensatory regulations, tax policies and development rights.

The approach must be different from that employed in the Susquehanna River Basin Coordinating Committee Study which had given flood control low priority. The recommendations of that study should be reviewed in light of the changes which have taken place in water resources management. Section 73 of last year's Water Resources Development Act requires that consideration be given to nonstructural flood damage reduction measures in the survey, planning or design by any Federal agency of any project involving flood protection. Importantly, cost-sharing will be the same for nonstructural measures as for structural measures.

To proceed with the determination of an optimum basinwide mix, information should be available on 1) the amount of flood damages sustained, 2) the specification of the level of protection desired, based on economic efficiency and social well being criteria, 3) the maximum amount of storage that is possible, and 4) the identification of complementary measures which will reduce flood damages to the degree desired.

The existing system of 17 dams or reservoirs constructed by the Corps of Engineers and the Pennsylvania Department of Environmental Resources provides control over a drainage area of 2,952 square miles. The effect of these existing reservoirs in reducing the flood of record prior to

Agnes at several locations in the Basin is shown in the material being displayed. The bar graphs for each of ten (10) locations in the Basin illustrate in feet, the National Weather Service flood stage, the natural stage of the flood event without reservoirs, and the modified stage of the event as affected by the reservoirs. This second series of bar graphs presents similar information on the effects of the reservoirs during Agnes.

These few data clearly indicate that the existing reservoirs lower river stages 1 to 8 feet and thereby significantly reduce flood damages. In addition, the Soil Conservation Service's P.L. 566 Small Watershed Projects control approximately 430 square miles. This represents a combined total of about twelve percent of the Basin's entire drainage area which is being controlled to some degree.

There are 85 local flood protection projects throughout the Basin - 37 of which are levee and floodwall projects and 48 channel improvement projects. The National Weather Service maintains a flood forecasting and warning system to deal with conditions occurring on the main river and its major tributaries. There are also civil defense programs at the state and local level which provide organization and resources during emergencies.

Most of these projects and programs existed prior to Agnes. Yet, in that flood, the Basin sustained almost 3 billion dollars of damages. Each year damage occurs in various locations throughout the Basin, usually as a result of less severe, but more frequent flooding. The Corps of Engineers is currently updating stage damage curves. Common sense and the Corps' current work serve to indicate that flood damages have markedly increased in recent years.

Water Resource agencies and the public face a continuing challenge to reduce flood losses estimated in earlier studies to average 14.4 million annually. The approach that is taken in identifying and implementing flood reduction measures is most crucial. Solutions should not be piecemeal or static. Aside from the long-term abandonment of the flood plain, there is no final solution to the problem of flooding. This is one point which should be made more explicit. The conditions which cause and determine the severity of flooding are continuously changing, as are the extent and nature of flood plain development.

It is the determination of an appropriate sequence of measures; and more importantly the determination of a process for identification and implementation of these measures that is being recognized here as a need.

Now to discuss the current Corps of Engineers program, which is their Flood Control Review Study, we have Colonel McGarry, District Engineer, Corps of Engineers, Baltimore District, with us today and at this time I would like to introduce Colonel McGarry.

Optimum Mix of Structural and Nonstructural Measures -
(Colonel Robert S. McGarry)

Presentation

I am Colonel McGarry, District Engineer, Baltimore District, U.S. Army Corps of Engineers. Our area of responsibility for flood control is the Susquehanna Basin, the Potomac Basin and the Chesapeake Bay. The source I will be talking about today is the Susquehanna Basin.

Very briefly I would like to talk about our existing system, projects that are under construction and plans that are underway. As Marshall mentioned we have 14 reservoirs authorized in the Basin, 12 constructed and 2 under construction. These reservoirs up through 1974 have prevented about 310 million dollars worth of damage, and as recently as last February they were activated for the storm we had had in the Basin which prevented several million dollars worth of damage, but to prevent that we did use one-third of our capacity. Two of the reservoirs, Tioga-Hammond and Cowanesque, are under construction at this time. Tioga-Hammond up near the Pennsylvania-New York border will cost 145 million dollars when it is completed. It is on schedule and it will be completed in the spring of 1978. In addition to flood control measures, the two lakes will provide a rather substantial recreation facility in that region. The major work underway at Tioga-Hammond right now is the construction of the dam, the spillway and the control tower. The cut-off trench of the dam itself is under construction. Cowanesque nearby is under construction for a total cost of about 77 million dollars. It is not scheduled to be completed until June 1980. The long thin lake is a rather smaller lake which will have limited recreation capabilities at Cowanesque. The major effort underway there at the present time is highway relocation. We have had to make some substantial construction cuts to relocate the highways due to the terrain. Recently completed was Raystown in central Pennsylvania for about 75 million dollars. The dam itself is completed but the recreation facilities are not completed. We will spend about 12 million dollars for recreation facilities, 5 million dollars through the fiscal year that just ended, 3 million dollars for fiscal 76 just starting, and a balance of 4 million dollars in later fiscal

years. The recreation facilities will not be completed this summer; however, we are providing some recreation in the form of boating.

Returning to our planning activities, a major effort is the flood control review study that was authorized by Congress in 1972 as a result of Agnes. They directed us to go back and look at the prior studies and update them in light of the Agnes experience. The study itself will cost around a million dollars. We have spent about half of that so far through last fiscal year, with the balance to be spent in fiscal year 1976 which just started, and 1977. Our overall schedule for completing the project and the major efforts I will describe later.

We intend to finish the project in January 1977. One of the first major efforts we undertook was to update flood damage data. The actual damage that we have accumulated by our resurvey in 1974 indicates that the formulas in both the Engineering News-Record and economic development formulas that we have been using did tend to underestimate the damage. Based on this and data from many communities, we have developed the methodology now for updating throughout the Basin more accurate estimates of damage. We have published a completed work on the Agnes flood damage reports. It is in two volumes and is ready for distribution by writing to us. It is rather thick for those of you who just want to leaf through it. This is the summary of damages in the Basin, and one of the things I find surprising is the high damages basinwide concerning the fact that Binghamton and the area upstream of Binghamton were not damaged during Agnes. There was relatively little damage, so if Agnes had been located a little differently we would have had substantially more damage.

We are looking at a series of nonstructural alternatives as we develop this plan. As Marshall mentioned, the Water Resources Development Act of 1974 gave us this authority or formalized this authority. There is some sorting out in Washington going over the cost-sharing aspect. Congress passed it, it is not necessarily the policy of the President or the Office of Management and Budget. I do not know what the eventual policy will be on cost-sharing. However, we are still looking at the alternatives. Four major efforts that we are looking at are floodproofing, relocation, regulation of the flood plain and flood warning and evacuation.

To talk a little about flood proofing, we have two efforts underway. Cornell University is making a study for us of what we feel is rather a typical community in the Binghamton area, and this study will give us computerized measures

of classifying the development, classifying the flood risk and hopefully a methodology for developing alternative nonstructural methodologies to reduce flood damages; sump pumps, waterproofing of the basements and things of that nature. This is being dealt with in a generalized nature and we would hope to use it throughout the basin as we finalize our plans. We took another look at floodproofing in our Lock Haven flood protection report. Some interesting facts came out of this. We found that it is rather expensive to floodproof a house in Lock Haven which appears to be a rather typical house. It would cost between 6 and 10 thousand dollars and on an average \$6800 to floodproof the building. On both residential and commercial facilities the damages prevented are not really as great as you would expect for the investment. In other words for a typical house that costs about \$6,000 to floodproof, approximately \$3800 in benefits would be realized. This is a level of protection equal to a flood of 50-year interval. We also found and reached some conclusions about typical buildings. Floodproofing much above 3 feet does not work because the walls cannot stand up under the pressure of the water; the structure would collapse. Many of the buildings have the first floor about two to three feet above the ground which indicates this is the most practical thing to floodproofing basements in this type of building. However, in commercial facilities we found that they can go about 3-6 feet to withstand the pressure of the water. Generally the business is on the ground floor rather than 2-3 feet above ground, and many of the techniques of floodproofing commercial facilities just goes against their business needs. Large show windows in front of stores of course can be bricked up for floodproofing, but it is not going to do any good if the person goes out of business. We did find that industrial-type facilities seem to get a very attractive return from their investment in floodproofing. Three facilities such as Piper Aircraft, Hammermill and American Analine in Lock Haven are examples. The 23 million saved at Piper Aircraft for a 125 thousand dollar investment is too high because it includes the damaged aircraft which could have been flown out anyway. At both Hammermill and American Analine a 16 thousand dollar investment would have saved 1.4 million dollars in damages.

In summarizing, residential buildings have a relatively high cost for floodproofing and low level of protection while commercial buildings have a higher cost for floodproofing but a higher level of protection. We will take data relating to Lock Haven, generalize it and add to it the cost data as to how much it would cost us to raise homes. We are also going to develop cost data figures to waterproof utilities in base-

ments where you would waterproof the utilities and allow the rest of the basement to flood, thus reducing this \$6,000 assessment. This data will then be used to generalize a part of our study throughout the basin.

Looking at relocation the reason for developing the computer program is to help us quickly develop a cost-benefit ratio for relocating this typical facility. Then with the cost data we will develop an economic zone for particular communities and examine relocation in combination with flood-proofing and maybe a wall or levee. A series of mixes as opposed to one single alternative. We are also of the opinion that more specific work should be done in the way of flood plain regulations rather than just a broad statement that you should regulate the flood plains. Flood warning and evacuation will also be included in that study. We are going to hear more about that here this morning. We will take the work generally of others to include in our study to develop an overall plan.

I would like to turn to the structural measures that we are looking at in addition to nonstructural measures. First, in examining a series of major reservoirs throughout the Basin, we looked at 22 sites throughout the Basin where they have the potential for reservoirs and combined them into a systems analysis; out of that came four systems that when combined with the existing reservoirs hold the most promise from a flood protection standpoint. Included in these are 5 reservoir systems; East Guilford, Genegantslet, Keating, Sinnemahoning and Copes Corner which have the highest potential from a flood damage standpoint. Right now we are combining the additional areas that will be controlled by these reservoirs, and have estimated damages that would be reduced were these new dams installed in conjunction with the existing reservoirs. We are also looking at other purposes for the reservoirs such as recreation and power to find cost-benefit ratios. We are also looking at a rather extensive series of small upstream reservoirs and what we will do is actually perform hydraulic problems to determine the effectiveness of these reservoirs either alone or in systems.

We have several studies underway for local flood protection. As we wind up that report we will look at many other communities, and the cost damage data that I mentioned earlier in this will play a significant part to make sure we have accurate damage data as we consider local flood protection. How do we put this whole puzzle together? We will take stage damage data work that we have done and the work that is done by others, develop a methodology to develop, community-by-community throughout the Basin, stage damage data that results from floods. Then we will take the nonstruc-

tural work to be done and divide it into a series of alternatives, nonstructural alternatives on a community-by-community basis throughout the Basin. Then we will bring in the reservoir systems analysis that we made and put it on top of the nonstructural analysis that we made and begin to develop a community subbasin series of alternative plans that are now a mixture of structural and nonstructural alternatives and put it all together to develop a community plan, subbasins plan and finally a total Basin plan. Throughout this project we will have a series of public workshops and public meetings to insure that we have community input into our work. In addition to the overall study we have other studies that have progressed further nearing the process of eventual authorization.

The Wyoming Valley study has been approved by the Basin Commission, the Board of Engineers for Rivers and Harbors and the Office of the Chief Engineers and it is in the Office of the Secretary of the Army for review and transmittal through OMB and Congress. The Lock Haven study is following right behind. It has been reviewed by the Board of Engineers for Rivers and Harbors and the Basin Commission and is in the Office of the Chief Engineers for review at the present time. Both of these studies are local flood protection projects. We have several other studies that have not yet left my office. Running down on these - Marathon, sometime back we had what looked like a series of recommendations. Changes in hydrology have caused us to revise those. We are now looking at smaller projects and the possibility of floodproofing as a solution in Marathon. In Bull Run and Brookside areas, we are working in conjunction with PennDOT to see if we can use a highway construction embankment as part of our flood protection project. If we are successful we have high hopes of developing a good project for those two areas.

In Milton, we completed a rather extensive review of the damage data and local flood protection construction necessary. At the present time it looks very unfavorable that we will have a good cost-benefit ratio and be able to recommend a structural solution to building.

In Harrisburg, foundation problems that we discovered quite late caused us to go back and review that study, look at alternative solutions and at this time we just started that work and I do not know whether we are going to be able to recommend a project right now. We have four other small studies underway in the Basin. These are review studies of existing flood control projects to see if they should be modified and they are in various stages of completion. This is a rather routine program that we can carry on

within our authority, and if they are justified they will in all probability be approved and constructed.

That completes our presentation, we are about two-thirds of the way through our work. We are half-way through our work dollar wise and two-thirds of the way time wise. The most difficult part, of course, is ahead of us as we take the data we have now gathered, put it into a series of alternative plans, get public input and develop recommendations. We are very interested in public input, public concern and in working with you all and the Basin Commission. It is my intent to complete the study on schedule in January for the Basin. Thank you.

Comment - (Dr. Maurice K. Goddard)

Thank you, Colonel. We will have an assessment now by Marshall and I am sure there will be some questions for you, Marshall.

Optimum Mix of Structural and Nonstructural Measures -
(Marshall S. Goulding)

Assessment

The Flood Review Study just described by Colonel McGarry is the major flood control investigative effort underway in this Basin. The study forms an important and basic element in the search for a comprehensive solution of the Basin's widespread flood problems.

In addition to the work of the Corps we have noted the SCS has several small watershed projects underway or in planning. Since Agnes, Pennsylvania Department of Environmental Resources has initiated construction of three major and several minor local flood protection projects. DER planning is underway for 28 additional local projects. Nine of these projects are in the design stage. New York Department of Environmental Conservation is currently designing a local protection project for Gangs Mills in Chemung County. Further planning regarding flood damage reduction is underway or has been completed by several of the regional planning agencies in the Basin.

In terms of attaining an optimum program, we - the agencies and the public - have a long way to go. At the planning or concept level, the activity of the agencies is diverse and fragmentary. While each agency has its own particular goals, there is no overall comprehensible and coherent basinwide approach before us to date which would insure

that the different goals and methodologies are compatible. While there is little disagreement with the general goal of reducing and preventing property damage and loss of life, more specific criteria or guideposts must be cooperatively established which will relate planning and project activity of individual agencies to an overall optimum flood plain management and protection strategy.

The various agency approaches should be closely examined to determine their role in and influence on the development of a basinwide flood damage reduction program. Each agency or group's role must then be made more explicit; the nature of the Basin's flood problem should be clarified; and a range and sequency of suitable measures should be identified for implementation. As indicated earlier the Corps of Engineers Flood Control Review Study is the single most important ongoing activity in the search for a comprehensive solution to our flooding problems. The various parts of the study will provide valuable information in the planning of a comprehensive program; especially in the planning of nonstructural measures. Particularly important are the revisions in the stage-damage curves and the work on a method to be used to continually update them; and the collection procedures and planning methodologies developed in the consideration of relocation and floodproofing measures for Binghamton and Lock Haven will be useful. Yet, the formal conclusion of this three-year study scheduled for completion in 1977 will not bring answers for many of the municipalities which suffer flood damage. There still remains the larger task, not solely that of the Corps, of (1) expanding and incorporating information on all nonstructural measures into the entire flood damage reduction planning process; and (2) applying the methodologies and data to the development of the specific structural and nonstructural elements of a comprehensive program which will reduce flood damages throughout the Basin.

The subbasin approach, recently employed by New York DEC in the Eastern Susquehanna and Chemung Basins, and currently underway in Pennsylvania's State Water Plan, is promising, and the recommendations which will come out of these efforts should be carefully evaluated. It is hoped that the states, in their planning and implementation, will consider the impact of their flood damage reduction programs on the flood hazard situation in downstream areas, particularly in those watersheds which are on or adjacent to state boundary lines.

In summary, we recognize that the existing reservoirs have an important and positive impact in reducing damages from floods. Many municipalities have local flood protection

projects that serve them well. However, given a repeat of the 1936 or Agnes conditions today, we would see a repeat of the 3.0 billion dollar or greater damages again centered in the protected areas. Such an event or lesser floods would also affect the many municipalities which lack any measure of protection or receive only minimal protection, including the considerable new development or redevelopment that has occurred in flood hazard zones. Nonstructural measures, aside from forecasting and warning and emergency measures, are only now being seriously considered as alternative or complimentary flood damage reduction measures. There is a clear need for an inter-agency effort to evaluate the relationship between structural and nonstructural measures, and to establish principles to guide the development of future flood damage reduction programs to assure an optimum basinwide mix. Thank you.

Comment - (Dr. Maurice K. Goddard)

Thank you. Are there any members of the Commission who would like to address a question to the Colonel? It does not exclude the introducers, either, if they have questions. Do you have any questions that you would like to address to Colonel McGarry, Commission Hullar?

Question - (Dr. Theodore L. Hullar)

I have a question that might be key. What is your methodology for your stage damage criteria?

Answer - (Colonel Robert S. McGarry)

This was developed by a house-by-house and building-by-building survey. We have done quite a bit of work in the three major subbasins throughout the Basin after which we will develop a formula for every community.

Question - (Dr. Theodore L. Hullar)

That is what I thought, but what is the methodology for doing the survey? Like, who asks the questions and how are those damages estimated? What is the element of standardization? Are the criteria documents for all available?

Answer - (Colonel Robert S. McGarry)

Well, it is basically by going out and looking at the buildings, interviewing people, looking at their records, going to the community records in the existing communities and putting it all together and winding up with a judgement.

Comment - (Dr. Theodore L. Hullar)

So it is based upon the interviewee's response to the interviewer.

Comment - (Colonel-Robert S. McGarry)

Well, not alone, by any means. We have someone look at it, experienced people who look at it and judge whether it is reasonable, too low or too high. In the long run it is our product and we have to be able to stand behind it and face the Congress and say that it is right or that it is wrong. We take interviews, tax records, insurance payments, etc., and put it all together and then make a judgment.

Comment - (Dr. Maurice K. Goddard)

This is the kind of process you are going to do now at Harrisburg, as I understand it.

Comment - (Colonel Robert S. McGarry)

That is correct.

Comment - (Dr. Maurice K. Goddard)

I think the point the Doctor makes is a good one. You know these fellows want to get higher figures now, so if you are not careful, you are going to get a lot of bias in it. It could be bias too low or bias too high. An interviewer, I am sure, has been trained and he has the same form.

Comment - (Colonel Robert S. McGarry)

Let me reiterate, the interviewer is just one step. It is our judgment whether that is a reasonable estimate of the damages and we have to stand behind it to defend ourselves.

Comment - (Dr. Maurice K. Goddard)

It is like a fire claim, I guess.

Question - (Dr. Theodore L. Hullar)

Let me ask two questions. You presumably have developed documentation to guide that process? Are those documents available so that they can be reviewed by agencies such as state agencies who might wish to do the same thing in areas where you are not working?

Answer - (Colonel Robert S. McGarry)

Yes.

Question - (Dr. Theodore L. Hullar)

Can we get them for example, by writing to you?

Answer - (Colonel Robert S. McGarry)

Sure. I imagine some members of your staff may already have them. If not, write us, we have regulations on how to do it.

Comment - (Dr. Theodore L. Hullar)

Right.

Question - (Dr. Maurice K. Goddard)

Gentlemen, I would like to ask a question of the Colonel on that study of those three reservoirs, Keating, Guilford and the other reservoir, has there been any discussion with the power people or our staff on consumptive use of water that could be cranked into those reservoirs?

Answer - (Colonel Robert S. McGarry)

Not extensively, no sir.

Comment - (Dr. Maurice K. Goddard)

I want to get that in there. What is the procedure for this?

I think that is one of the crucial issues as I see it, not only for power but for irrigation and other uses. Can we get into that? We will initiate that with you, Colonel.

Comment - (Colonel Robert S. McGarry)

Yes sir.

Comment - (Dr. Maurice K. Goddard)

Okay. Yes sir.

Question - (Robert Slaff)

Colonel, would you elaborate a little more on those systems, on the 3-B, I believe you called it, Keating and East Guilford. Could you tell us a little more what those terms mean. Tell us a little more about those reservoirs. I understand those are ones you think would be most effective.

Answer - (Colonel Robert S. McGarry)

No, not at all. From a pure flood reduction standpoint, those three coupled with the existing provide the best.

Question - (Robert Slaff)

What are those names? Are they names of communities?

Comment - (Dr. Maurice K. Goddard)

They are communities on the West Branch of the Susquehanna River just below where Sinnemahoning Creek comes into the West Branch. In New York State I would call it the east arm of the Susquehanna above Binghamton to the east and north of Binghamton.

Comment - (Colonel Robert S. McGarry)

They would not stand alone if we went for authorization right now. We have to include recreation, possibly water quality, consumptive loss, and we are also looking at power possibilities. Purely from the flood stage standpoint they look most attractive. The others are attractive also.

Comment - (Dr. Maurice K. Goddard)

I do not think we want to get into too much detail today on specific issues.

Comment - (Elizabeth Tamsett)

In 1952 we went before the Board of Rivers and Harbors and asked that the Mt. Upton Dam be deleted from this plan. I live in that area and we are very opposed to the East Guilford Dam which does about three times as much damage as the Mt. Upton Dam and this would be a very destructive deal. We are going to fight it to the very end.

Comment - (Dr. Maurice K. Goddard)

There is no recommendation yet, Madam.

Comment - (Elizabeth Tamsett)

Well, it is in the Coordinating Committee Study Report and we have studied it very carefully and we have studied it since 1952 and we do not want to see things added to make the benefits right. We do not want it. We want it some place where it does not damage all the good property and agricultural land in a very beautiful valley.

Comment - (Dr. Maurice K. Goddard)

We understand, thank you. Alright, Dr. Allee.

Question - (Dr. David Allee)

What I would like to dwell on a little bit is the question Marshall raised on how do you put the various pieces together and who does it?

Question - (Dr. Maurice K. Goddard)

You mean nonstructural as well as structural?

Comment - (Dr. David Allee)

Integrating the various parts, not only the Corps responsibilities, but also the responsibilities of SCS, the local governments, etc.

Comment - (Dr. Maurice K. Goddard)

Well, of course, that is part of our role as I see it. Perhaps that is too short of an answer but I think we have got to do everything we can nonstructurally. That is why we want a flood plain management bill. That is why we want to keep construction off the flood plain. I do not think you can do too much of that, frankly.

Comment - (Dr. David Allee)

Well, I agree, you never run out of opportunities, but getting an agreement is often another question and I think the responsibility for getting an agreement, of course, rests very heavily on the state members and the state agencies that are associated with the Commission and also cooperate with organizations like the Corps. But what I would like to explore a little bit is how this study might be done under a Water Resources Council authorization through a Title II River Basin Commission. I am just raising that just a bit rhetorically, but wondered if anyone has an opinion as to what the Corps is now doing with a typical Level B Study.

Comment - (Dr. Maurice K. Goddard)

Do you want to tackle that, it sounds to me a little bit like the same thing.

Comment - (Dr. David Allee)

Right, this will not acutally give you a project authorization request.

Comment - (Colonel Robert S. McGarry)

Good point. What I expect the product to be, Dr. Allee, is that community-by-community throughout the Basin, here is what we looked at ranging from nothing to a dam at Keating, to floodproofing, to all of those wrapped into subbasins and the total Basin. I hope when we are finished we will have given them the alternative of a good mix and a recommendation and one they should pick, if any, and for some of them the answer is going to be buy flood insurance.

Comment - (Dr. David Allee)

Once you have made that recommendation it is a general

planning kind of recommendation where a detailed study of the survey scope to use the Corps language would still be required before one could go to Congress for authorization and then go back to Congress for an advance design, go back to Congress for appropriation of funds for actual construction and finally get something. I wanted some clarity as to where we are on this thing.

Comment - (Colonel Robert S. McGarry)

Following this study it will be necessary to prepare survey reports on a project-by-project basis and then go back to Congress for authorization of the project. I have already started budgeting money to make those studies starting in fiscal year 1978, right after we finish this one, provided we get the support all the way along the line. I would guess that we would get the support.

Comment - (Dr. David Allee)

Well, let me bring this back to the coordination question again. It is my understanding, I am asking the question again, somewhat rhetorically, but again I think it is something that I think needs to be explored. If this were a Level B Study being done under the Water Resources Council authority through a Title II River Basin Commission, it is my understanding that a considerable allocation of the planning funds itself would be done through the Commission. Do you know whether this is correct or not?

Comment - (Colonel Robert S. McGarry)

I really do not know.

Comment (Dr. Maurice K. Goddard)

It could or could not be.

Comment - (Dr. David Allee)

Certainly a study manager would be appointed with the concurrence and through the Commission involved. I think there are some arrangements here that this Commission ought to look at very carefully. The whole relationship for development of budgeting for this type of study which is after all, I think, quite comparable to the Level B Study.

The role of the Commission, these things all need to be thought out a little more perhaps than we have thought them out.

Comment - (Dr. Maurice K. Goddard)

Particularly if we go through another one.

Comment - (Dr. David Allee)

Well, planning never stops.

Question - (Roger Carrier)

I would like to ask a question of the Colonel out of my ignorance.

Comment - (Dr. Maurice K. Goddard)

Maybe you ought to give your name so the people will know who you are.

Comment - (Roger Carrier)

My name is Roger Carrier. I am with a consulting firm in Harrisburg. We frequently talk about nonstructural measures and structural measures and how we might mix these two. It seems to me funding transcends all else in shaping politics. What kind of funding does the Water Resources Act of 1974 allow, funding for such things as relocating houses out of the flood plain or commercial buildings? Does it allow acquisition of lands that have not been developed, does it allow monies to come up with flood plain zoning programs so we do not continue to build on the flood plain, and if that act does no funding, is there some other funding mechanism you might be able to summarize to pay more than lip service to these nonstructural alternatives?

Answer - (Colonel Robert S. McGarry)

Let me give you my opinion rather than the facts because there are no facts right now. It was believed that the intent of the Congress was that Federal funding would be available for floodproofing. That was an alternative recommended by the Corps. It is also my opinion that the Office of Management and Budget acting for the President

is of the opinion that in no way is the Federal government going to get into that operation. Somebody is going to have to get one of these projects all the way to Washington to thrash out that type of thing and I volunteer. We are going to push awfully hard. I do not know if anybody is going to beat me to get one in there with a specific set of recommendations to force the issue and let somebody act. I was specifically told, do not tell anybody what the Corps policy is on cost-sharing because OMB has not made up their mind.

Question - (Thomas C. H. Webster)

Colonel, what did the Corps do in the case of Rapid City?

Answer - (Colonel Robert S. McGarry)

There are two recommendations in process, one is Prairie du Chien, Wisconsin and one up on the Charles River in Connecticut, where officials of the Corps are in a little bit of trouble for announcing their recommendations before OMB has made up their policy. It is not firm, I must be honest with you, OMB has the business of cutting the budget.

Comment - (Dr. Maurice K. Goddard)

You ask a very important question, but to show how sensitive the Pennsylvania Legislature is about acquiring land on the flood plain, there is a provision in Senate Bill One that we cannot do this at the state level unless we go back to the General Assembly and get a specific dollar allocation for the department for a specific acquisition program. It seems so logical this is the right way to go, but they are so sensitive of the state government acquiring more land. There is a provision that DER cannot do this without going back to the General Assembly except on a case-by-case basis and get a specific authorization and a specific appropriation. Yes sir.

Comment - (Ken Sorgen)

I just want to clarify something with the Colonel here and then just a brief comment from you, Colonel. About a year ago we met with you in the Williamsport area and this is when you told us about this survey on the West Branch. Did I understand you right now that in January of 1977 you will come up with the overall recommendations for the area? My point is, there seems to be a lot more cranked into this than what we originally talked about a year ago and in other words this will be the last?

Comment - (Dr. Maurice K. Goddard)

No. Dr. Allee said earlier we were going to keep the continuing planning process.

Comment - (Ken Sorgen)

What I am saying is, will there be action of some sort taken off of this?

Comment - (Dr. David Allee)

Depends on what you call action.

Comment - (Ken Sorgen)

It is three years since the 1972 flood and there has been a lot of survey and assessment and everything else and the people are just a little bit concerned about some action and this is my point, I take it from what he said there would be action taken off of this.

Comment - (Dr. Maurice K. Goddard)

Well, I think it would depend upon the attitudes of the people when they read their report. I think that determines what kind of action you get. You heard one lady say if they recommend a reservoir near her area she is going to oppose it. Now somebody else with a reservoir near them, they might support it. But I think the action determined at that point is what we think is important out of the report. When I say we, maybe local government, county government, state government, the Commission, we will have to evaluate that and make that determination. I do not think anybody can prejudge now what is going to be accepted and what is going to be rejected. Maybe somebody else can respond to that better than I can, but that is the way I feel. Anyone else, yes sir.

Question - (Unidentified Person)

I have just a simple question. I wonder what is considered a nonstructural measure rather than a structural measure?

Answer - (Dr. Maurice K. Goddard)

Well I think we mean structural in terms of reservoirs,

levees, channelization. When we talk of Corps, DER and other state agencies, structural measures are to prevent flooding and we are trying to keep water away from the areas that are going to be damaged. I think that is just the terminology. Our terminology is channelization, SCS reservoirs, Corps reservoirs, levee systems, that type of thing. Keep the water away from the buildings.

Comment - (Unidentified Person)

I had a discussion with the county commissioners in Clearfield County and they would welcome the Keating Dam. They belong to our organization out here, they are anxious for this project.

Comment - (Dr. Maurice K. Goddard)

We have one more item we would like to complete before lunch time. Rosemary McLeod of SRBC staff will present Regulations.

Comment - (Robert J. Bielo)

While Rosemary is coming up could we do one thing here, and that would be maybe take just a quick breather, and secondly introduce some of the groups that are here. I think we all have heard of the West Branch Valley Association, we know you folks are here. We know there is a group here from SCS and the Geoscience Corporation, which is a government consulting group which gets together to talk about various types of engineering problems and in this instance they are interested and they brought their regular meeting group here to hear this particular topic. We know the Susquehanna River Basin Association members are here, or some of them. If there are any other groups that I have not mentioned, we would appreciate you saying who you are right now so the rest of the folks here would know. We know there must be someone from New York State here. The lady who expressed some comments. Are there any other particular groups or areas that are represented who might want to put their name on the record so we will all know. I see a lady from Maryland, League of Women Voters. Are there any particular groups we might mention?

Comment - (H. Hiteman)

The Upper Unadilla Association.

Comment - (Robert J. Bielo)

Okay good, are there any other groups that we might mention at this time? Okay, if not, at least we welcome all of you here and we will go on with the program. All three states are represented and of course there are a lot of Federal people here.

Regulations - (Rosemary McLeod)

Need

The next need that we have identified is the development and extensive and effective use of flood plain regulations.

Historically, municipalities have had little incentive to include flood plain regulations among their ordinances. Flood plains, with their location adjacent to water, relatively good soils and topography, are attractive sites for settlement. Over the last forty years structural flood protection projects have encouraged the development of flood plains, and have inadvertently fostered the mistaken belief that individual communities need not take any additional steps, such as instituting regulatory measures, to protect themselves.

In many instances, there is no available or suitable site for the construction of structural measures. Also, the cost of structural projects may not be justified by the flood damage reduction benefits. With increasing urbanization and increasing flood losses, regulations have become an important tool in flood plain damage reduction programs.

Regulations serve primarily to diminish the potential for future flood losses by guiding development away from hazardous areas. They may also reduce loss to present flood plain uses through elimination of nuisance and non-conforming uses, and floodproofing requirements.

The National Flood Insurance Program has been the major mechanism for the adoption, by flood prone municipalities, of the appropriate land use controls, individual zoning ordinances, subdivision regulations and building codes. The controls, basically, prohibit future nonconforming development of the floodway, but allow construction in the floodway fringe if structures are elevated or floodproofed.

In confronting the increasing economic and social costs of flooding, some municipalities are beginning to accept their responsibility in preventing unwise development of flood plains. Several states have moved to obtain authority to regulate flood plain law and Pennsylvania and Maryland have such legislation under consideration.

Now I would like to introduce to you Dr. Keith Muckleston who is a Staff Specialist in the Policy Division of the Water Resources Council. He is going to discuss the Council work with the Unified National Program for Flood Plain Management.

Regulations - (Dr. Keith Muckleston)

Presentation

Thank you, Rose. Ladies and gentlemen, let me say that our Director, Warren Fairchild wanted to be here today, but he had some overriding business in front of Senator Church's Interior and Insular Affairs Committee, which is holding oversight hearings on the Water Resources Council. I would imagine that he is in front of Senator Church now and that he wishes that he was here.

I have been with the Council for approximately a year, on loan from the State of Oregon. I am going to return to the Pacific Northwest in several weeks, so I speak to you as a state person who has functioned as a Fed for a year. My principal role at the Council has been as Chairman of an Interagency Task Force that was assigned to resuscitate the long overdue report known as a Unified National Program for Flood Plain Management. I heard somebody in the audience say earlier when this topic was announced that they did not know we had one; well, we do not. We have been trying to come up with a conceptual statement now at the Federal level for over five years. The report was to have been completed and submitted to the President in 1970. We are in FY-76 and the Federal agencies are unable to even agree what a Unified National Program for Flood Plain Management is. I would like to comment on Walt's statement that coordination is good in the field between agencies. I wish that the agency people in field could move that spirit upward to Washington.

The bulk of my remarks today will deal with the draft report, The Unified National Program for Flood Plain Management, and how it relates to regulation. I want to say at the outset that I believe that it is the Water Resources Council's position that it is imperative that we have more stringent regulation of the nation's flood plains; and that without more stringent regulation, the exposure to flood hazards will increase despite large sums spent to control floods and to aid flood victims. I would like to mention a few statistics from Gilbert White's most recent work, The Assessment of Research on Natural Hazards, which has just come off the press. I think most of you know that Gilbert White is the leading authority and proponent of a unified approach to flood plain management and regulation of flood plains to supplement other approaches. He notes that the present rate of urban expansion into the flood plains of the nation is annually between 1-1/2 and 2-1/2 per cent. He notes further that much of this ex-

pansion is unnecessary, that is, it gains no special benefits from locating in the flood plains. White goes on to state that in the long run, the management of flood plain land use may be the single adjustment most likely to reduce national flood losses, although it is not certain it would yield the largest net benefits to the nation. In the short run the amount of damage reduction would be relatively low due to the difficulty of removing existing properties from the flood plains. He sees a highly optimistic rate of removal from flood plains to be about three per cent a year. But he is careful to note that methods for doing this through possible use of subsidies or tax incentives remain to be worked out.

I would like to say a few words about the background of the Unified National Approach for Flood Plain Management. It seems from the often quoted report, House Document 465, which is entitled A Unified National Program for Managing Flood Losses, also known as the White Report because Gilbert White was the Chairman of the group that drafted the report. That particular document recommended a series of steps that could be taken to offset the rising exposure to floods; a rising exposure despite the fact that the country was spending increasing amounts to prevent flood damage. That particular report bore considerable fruit, one of which was the Flood Insurance Act of 1968. It is from one of the sections of the Flood Control Act of 1968 that this report that the Council has been working on had its beginning. In Section 1302-C of the 1968 Flood Insurance Act, Congress stipulated that the objectives of the National Flood Insurance Program should be integrally related to a unified national program for flood plain management. To this end it was the sense of Congress that within two years following the effective date of this title the President should transmit to Congress for its consideration any further proposals for the allocation of costs among beneficiaries of flood protection. Therefore to keep the schedule that Congress set, the report should have been before the President in 1970.

The job of writing the report was assigned to the WRC by OMB. Since then the agencies have been getting together and writing up what the program should entail. There have been a number of chairmen who have sat in my place and have come and gone. There have been a number of different people working on the report, probably 25-30 over the last years. After a period of very vigorous discussion, some people would say in acrimonious debate, the report reached its high water mark late in 1973 when it went through the Council mechanism. The draft report, including legislation, was prepared over an 18-month period and approved

by the COR on December 13, 1972. All agencies concerned agreed that the draft report and legislation should be submitted to the OMB as soon as possible so that it could receive full consideration as part of the President's overall program in natural resources.

By a letter dated March 8, 1973, Assistant Secretary John W. Larson noted that the Chairman of the WRC had determined that it would be undesirable at that time to transmit the legislative proposal, because such a basic change in the traditional role of the Council would require full discussion and consideration of the COM.

At the COM meeting of June 23, 1973, the general consensus appeared to be that further effort to advance the proposed legislation should be deferred until Congress acted upon land use legislation and the Flood Insurance Act Amendments. In addition, it was noted that there was a need for more direction in the guidelines to accomplish flood plain management objectives.

The OMB subsequently returned the draft report of the Unified National Program for Flood Plain Management and the draft legislation to the WRC for further review. In a letter to Chairman Rogers C. B. Morton dated August 2, 1973, Mr. John C. Sawhill, Associated Director of the OMB, requested that the WRC reconsider the draft report of the Unified National Program for Flood Plain Management in light of the conclusions on this subject at the COM meeting of June 26, 1973. Specific points mentioned in his letter included: (1) revision of the draft report to avoid any ambiguity regarding the relationship between the report's recommendations and the Administration's land use bill; and (2) a reconsideration of the source of any Federal financing for a flood plain management program.

The Department of Interior was instrumental in torpedoing the report (even though they had helped to write it) because one particular section of Interior felt that it was the rightful manager of the nation's flood plains and once the legislation was passed, it should manage it. This is one of the reasons, this interagency rivalry - why the report is still not completed.

In 1973 this report, which was in my opinion pregnant with possibilities, was aborted by OMB and laid to rest. When I came on board in the summer of 1974 we exhumed the report and did a post mortum on it and during the fall a new group tried to resuscitate the report and now that we have resurrected it, it's under examination again. Tomorrow it goes to the policy committee. Yesterday the states, through their State Standing Advisory Committee, submitted their

report on our draft report. In addition the report has been sent out for evaluation to six of the leading flood plain specialists outside of government.

The new report is somewhat watered down, if I may use that term, from the old report. In the first place it has no legislation because we do not want anything to interfere with the land use. Secondly, there is very little mention of alternative institutional arrangements. We were directed by the WRC's Policy Committee to concentrate on a conceptual framework. This is what we have done and this is why we have been criticized by the consultants, because we are giving Congress a third of a loaf or a half of a loaf at best. We say very little about cost-sharing. This is excusable because the present Section 80 Study is addressing the question of cost-sharing regarding all of the uses of water in detail. The Section 80 Study is due for completion within the month, then must be approved by the President, that is OMB, before it is forwarded to Congress for its consideration. I might point out that the Section 80 Study not only considers cost-sharing but also the objectives of water planning and the interest rate formula to be used in plan formulation. All of these are very crucial issues. You can imagine if the cost-sharing mix is changed by Congress, there may well be significant repercussions in the way we go about approaching the flood hazard.

Comment - (Dr. Maurice K. Goddard)

This would be cost-sharing for the structure itself, if it is a local levee system.

Comment - (Dr. Keith Muckleston)

I don't know - - it would depend on the Section 80 Report and on subsequent actions by Congress.

Comment - (Dr. Maurice K. Goddard)

It is an important point, we cost-share now on land, but we might be cost-sharing on the structure as well. Sorry to interrupt, but I just wanted that understood.

Presentation Continued - (Dr. Keith Muckleston)

Now, in terms of cost-sharing, Section 73 has been mentioned several times here today and I just wanted to add something.

Section 73 has been stonewalled by OMB despite the most diligent efforts by the WRC to get approval of an interim policy. Subsection 73(a) calls for equal consideration of structural and nonstructural means to alleviate flood reduction and then in Subsection (b) sets out a rather confusing description of how the costs are to be shared. The Council recommended that it come out 80 per cent Federal, 20 per cent non-Federal for both structural and nonstructural. However, this would not apply to large dams that now have zero per cent cost-sharing. This has gone to OMB on two occasions and they have thrown back negative replies. At present, the Departments of Agriculture and Army are trying to agree on a letter that OMB will agree with on an interim policy. As I understand it, OMB can live with Army's approach. Agriculture, however, cannot live with the approach that is workable for Army due to the differences in their programs. I would point out that OMB holds all the high cards and whereas it takes months of coordination between the agencies to get a statement on something like this, then OMB can reject it in a day or two.

The present situation then with our unified national approach to flood plain management is that it has been reviewed by consultants. The states have had their say and although they agree with the spirit of the report, are critical of the recommendations for state action that has not been carried out at the Federal level. The Policy Committee is going to meet tomorrow, on the 15th, and then the question will be whether to rewrite the report, strengthen it in accordance with Section 1302-C, send it forward to COR and try it again or whether to just go ahead and send it forward to see what will happen. That is where it stands. The goals of the report as I see it would be to stimulate legislation and act as a guide to legislators. It could also spark more executive orders and could influence agencies to rewrite rules and regulations affecting flood plain use. It also was designed to be another guide to non-Federal decision makers, although I must admit there are better sources available for these purposes.

The report rejects the dependence on traditional approaches which have relied on modifying flood flows and on giving post flood aid. The report calls for a comprehensive approach by including flood plain regulation as an equal with the other means of modifying the flood hazard. The report builds on the idea that a flood hazard may be adjusted to by any one or a combination of three ways. The first way, the one that we have done for a number of years, is by modifying the flooding with structures. The second,

is by modifying the impact of flooding on individuals and communities, which includes aid, insurance, and emergency measures. The third is by modifying the susceptibility to flooding. It is under this category, modifying the susceptibility of flooding, that regulation is dealt with in some detail. You gentlemen have the reports and in the Table of Contents, under Chapter 4-A are found four different breakdowns of ways to modify the susceptibility to flood damage and disruption. These four are: flood plain regulations, development policies, floodproofing and flood forecasting and warning systems and emergency plans. Floodproofing and flood forecasting will be dealt with this afternoon so I will not say anything about them.

Those of you who have copies of the report - - and I realize there were only 15 on the back table after 10 were distributed here - - might turn to the recommendations that were made. On page one, we will start with the recommendations for the Federal level, and I would ask you to notice the very general language under the heading, Recommendations. It says serious consideration should be given to the following actions by decision makers at and in the appropriate levels and branches of government. We had to couch it in these general terms because we were not allowed to break down the recommendations into agency action, legislation, etc. So these recommendations can be taken anyway you want to take them, it is up to the appropriate decision maker to decide that. Appropriate is the administrative weasel word that I have learned since coming to Washington. If anything is too sticky to handle we just assign it to an appropriate decision maker or an appropriate level or to an appropriate action to be decided at some other time.

The recommendations 3, 4 and 5 deal with flood plain regulation. No. 3 says require appropriate land use regulation or control measures as a pre-requisite to Federal expenditures for the modification of flooding or of the impact of flooding. In other words, if an area is going to receive benefits from Federally financed structures that modify flood waters, they are going to have to regulate land use; and, if they are going to receive post flood aid they are going to have to regulate. There is already some legislation on the books that could be used. I refer you to Section 84-B of the Water Resources Development Act of 1974, otherwise known as P.L. 93-251. This has not been implemented; however, like many of the laws nothing is being done. It calls for the local government or the non-Federal interests in Arlington, Virginia near Four Mile Run to do the following things before the Federal Government will initiate construction on the project. First of all, they have to agree to these things to prevent

encroachment. They have to floodproof at their expense present and future buildings against the 100-year flood. They are supposed to develop the land management planning process to insure that increased development in the Basin will not increase runoff, and they are supposed to also develop land management processes to assure that future development will not be permitted unless suitable structural and/or nonstructural means are first undertaken at no Federal expense. In terms of tying this recommendation 3 to the impact of flooding, I would call your attention to Section 406 of the Federal Disaster Assistance Act of 1974 (P.L. 93-288).

Under the provisions of this Act, the state or local government shall agree that the natural hazards in the area in which the proceeds of the grants or loans are to be used shall be evaluated, and appropriate action taken to mitigate such hazards, including safe land use and construction practices in accordance with standards prescribed or approved by the President after adequate consultation with appropriate elected officials of the general purpose local government. The state shall furnish such evidence of compliance with this section as may be required by regulation. The implementation of Section 406 fell on the shoulders of the Federal Disaster Insurance Administration and they did not want to touch that with a ten foot pole. HUD more or less forced them into it after a year and they are going about it now with the FIA. The problem of how to implement Section 406 has been turned over to a team of top consultants. I believe that this plan will be done in about six to nine months time. Gilbert White and James Goddard are two of the people who are working this up for FDAA and FIA so as you can see, they have the top talents in the country to help them out. If Section 406 is implemented, flood plain regulation will be much more a reality than it is today.

To go on to recommendation number 4 for the Federal level. It says implement the cost-sharing policy that encourages an appropriate mix of structural and nonstructural approaches to flood hazard adjustment. As I mentioned earlier, we hope that the Section 80, Presidential Study Team is going to make its recommendations on cost-sharing. I cannot let you in on what they are going to say because I do not know, but this report is due soon.

The fifth and last recommendation for the Federal level is couched in very general language. It says: provide appropriate support to the states so that they may exercise their primary role in flood plain management. Originally we had noted that this would be done through the extension of Title III monies which encourage planning at the state level, but OMB is opposed to continuing Title III, so we, as part of the Executive Branch, had to work this a little differently.

It can mean if Title III is continued, (and I might mention that Senator Church and other people in the Interior and Insular Affairs Committee are very much in favor of continuing it, and of course the states are also), the states will continue to receive technical aid, information and the things that are going on now. The report recognizes that the non-Federal level, particularly the state is the key-stone to implementing land use regulations.

I just want to say a couple words about the state level recommendations. One and two have a direct bearing on regulation while the remainder are rather indirect. Number one says: establish a single state agency to assume responsibility for flood plain management and to issue state standards as flood plain management guides for state agencies and local entities. This was endorsed by the states, at least by SSAC members yesterday, although they did not particularly like it coming from the Federal level. Recommendation number 2 would have the states enact enabling legislation specifically addressing the flood plain regulations in those states where such legislation does not exist. I believe that about half of the states have legislation that would satisfy that recommendation. We have made progress, because in 1962 there was less than one-fifth of the states that had such legislation. How much of it is due to the mandatory aspects of the Flood Insurance Act? I would say a good bit of it. How much would come about anyway it is very difficult to say. In short, if the Unified National Program for Flood Plain Management is promulgated, it will strengthen the hand of those advocating a greater use of flood plain regulations. It could do so in three ways: it will have the stamp of approval of the Council and thereby encourage Federal agencies to pursue a unified approach to flood plain management, it would encourage the President to issue Executive Orders as needed and it would stimulate legislation. Am I supposed to go until 12:00?

Comment - (Dr. Maurice K. Goddard)

You do not have to.

Comment - (Dr. Keith Muckleston)

I do not know how to take that.

Comment - (Dr Maurice K. Goddard)

You are doing a good job.

Comment - (Dr. Keith Muckleston)

Alright, I will take you at your word.

Comment - (Dr. Maurice K. Goddard)

But I would like to have some time for questions, maybe we can go to 12:30.

Comment - (Robert J. Bielo)

I think we have our lunch planned.

Comment - (Dr. Maurice K. Goddard)

Alright, you can go to 12:00.

Presentation Continued - (Dr. Keith Muckleston)

I want to put on the agency hat now and point out that the Water Resources Council has done a number of other things that would encourage flood plain management even though some of its efforts have been blunted if not totally negated by the limitations within the WRC operational mechanisms. The chief limitation is agreement by consensus. Now the agencies have to agree on everything that is done. When you get ten different opinions and one or two agencies feel that their programs will be threatened then we do not get an agreement. So sometimes we do not move very far. This would, I think, raise questions about the viability of the Council mechanism, and that is what the hearings today are about. Well, one of the things that has contributed to flood plain management is the almost one thousand page, 2 volume, publication entitled, Regulation of Flood Hazard Areas to Reduce Flood Losses. I think most of you are familiar with that.

Comment - (Dr. Maurice K. Goddard)

You scared Herb Packer with that. He is our developer around here.

Presentation Continued - (Dr. Keith Muckleston)

The object of that report is to provide specific information regarding flood plain regulation. It also stresses

the need to harmonize regulation with other approaches, noting that traditional approaches used by themselves are frequently less than totally successful. More specifically the report explores selective issues in the regulation of private and public land uses and presents draft statutes and local ordinances for regulation of land uses in riverine and coastal flood hazard areas. I am suggesting that the publication of this report is at least partially responsible for the growing number of states that have flood plain regulation programs.

Another publication of the Council that is much smaller (less than 25 pages) and probably of much less significance is The Flood Hazard Evaluation Guidelines for Federal Executive Agencies. This small document was designed to offer guidance to Federal agencies in implementing Executive Order 11296. That Executive Order (in 1966) was also a spinoff of HD 465, the White Report. Executive Order 11296 directed Federal agencies to evaluate flood hazards in the following things: in their construction and disposal programs and also in grant, loan and mortgage insurance programs involving public and private facilities. They were ordered to take such action as precluding hazardous use of the flood plains; flood-proofing Federal structures in the flood plains; attaching use restrictions when selling flood prone Federal lands; and withholding from disposal Federal lands with flood hazards. If you want to see a case study of how Federal agencies can and do ignore Executive Orders, you should read the recent GAO report published in March which evaluates the implementation of EO 11296 among other things. This is not to say all agencies failed to carry out 11296. There were some who implemented it quite well, others were blatantly neglectful.

A third small publication by the WRC that may help in regulation of lands, is entitled, A Uniform Technique for Determining Flood Flow Frequencies. It is also known as Technical Bulletin 15. This was published by the Hydrology Committee in 1967. It is presently being updated. I expect that the new version, which will be applicable over wider parts of the country, as I understand it, will be out within the year. Of course, effective flood plain regulation depends in part on delineation of the flood hazard areas. And that report, encourages uniform and consistent approach to analysis of flood frequencies. I believe it strengthens the regulations of the flood plains. I am not suggesting that the report is the answer to your problems, I know that there are more definitive works out, but it is an attempt. I think that I will close with that. I hear some stomachs growling and I do not know if it is out in the audience or it's my own. At any rate I would be happy to try and entertain any questions that you have after lunch.

Comment - (Dr. Maurice K. Goddard)

Thank you very much, that was a very excellent presentation. We will have our assessment after lunch which will give us a tie from morning to afternoon. We have facilities for the people that have been speakers. You can eat with the Commissioners. We hope that we can now get back at 1:30. Please try, I think we can do that. Thank you very much. Thanks again Keith, an excellent presentation.

- Lunch -

Comment - (Dr. Maurice K. Goddard)

We will now have an assessment by Rosemary and then we will have a discussion session.

Regulations - (Rosemary McLeod)

Assessment

Communities will have to take a hard look at their goals for a flood loss reduction program when developing regulatory mechanisms. Flood plain regulations should be based on a comprehensive land and water management plan which balances the demand for residential and industrial flood plain development with recreation and open space needs, and hydrologic conditions, and which directs uses to the most suitable kind of land. Decisions must be made concerning the type and manner of land use which will be allowed in flood hazard areas.

We have earlier discussed the importance of having every flood prone municipality adopt flood plain regulations, principally through participation in the National Flood Insurance Program. In the Basin, however, there are over 700 municipalities which are not yet eligible for flood insurance and thus are not required to adopt the proper land use controls. The delay in bringing these municipalities into the program and in providing them with the detailed studies will prolong the opportunity for continued damage prone development on the flood plain.

In the Basin, there is a wide variety among municipalities in terms of flood plain acreage and flood plain population. The degree to which municipalities will have to revise or expand their ordinances and plans, or adopt other flood plain management measures depends upon the relative amount and use of the flood hazard area within its boundaries.

The Commission staff has examined the land use controls of several municipalities currently under study. The review indicates that, on the whole, ordinances of those municipalities currently in the Emergency Flood Insurance Program will require significant revisions to assure that the minimum standards of the regular program will be met upon completion of the detailed studies. There is also a wide variety among municipalities in terms of their capability to develop, adopt, and enforce flood plain regulations. Even though model ordinances are available, most municipalities will have to rewrite the models to meet their individual circumstances. This suggests a definite need for technical, legal and financial assistance to enable the municipalities to adopt acceptable regulations.

New York's Flood Plain Management Law directs the state to provide the technical and legal assistance necessary to enable municipalities to meet the standards for participation in the National Flood Insurance Program. The programs which may come out of any successful legislation in Pennsylvania and Maryland should, as a minimum, provide technical and legal assistance to municipalities. In addition, state flood plain management programs should serve to assure the local regulatory and management measures are consistent with regional or statewide flood damage reduction objectives.

The fairly recent application by municipalities of flood plain regulations precludes, at this time, an assessment of their effectiveness. Any future evaluation of flood plain regulations as a means to reduce flood damages must address the degree of local enforcement. While the ultimate responsibility for regulations lies at the local level, states, through their assistance programs, could provide continuing hydrologic expertise which would aid municipalities in evaluating the impact of allowing the certain land uses in the flood plain. There could also be established an intergovernmental program to monitor flood plain development through aerial photography and field surveys. This could be part of an effort to minimize the potential for inconsistency or conflicts between adjoining states in the implementation of their flood plain management programs. Local flood plain management is best accomplished through a combination of regulatory and non-regulatory measures which will both reduce or avoid flood damage to future development and limit damage to existing uses. The adoption of flood plain regulations, throughout the Basin, is an effective and necessary part of a comprehensive program to reduce flood damages which successfully integrates both structural and nonstructural measures. Thank you.

Comment - (Dr. Maurice K. Goddard)

Okay, we are ready for questions.

Comment - (Thomas C. H. Webster)

I would like to make a comment.

Comment - (Dr. Maurice K. Goddard)

Okay, comments first.

Comment - (Thomas C. H. Webster)

I would like to express my gratitude to Keith for this presentation because I think he pretty much brought out how difficult my job sometimes is in representing the Federal government.

Comment - (Dr. Maurice K. Goddard)

Your role is to get them together.

Comment - (Thomas C. H. Webster)

That is an arbitrary action on my part.

Comment - (Dr. Maurice K. Goddard)

It was a very frank discussion, we appreciate it. Commissioners, do you have any questions, Dr. Allee?

Comment - Dr. David Allee)

Well, I would point to a problem that perhaps asks a question, again perhaps rhetorically. The states, New York and hopefully the others, will come up with an authorization to provide technical assistance in a kind of an overview capacity. It is one thing to pass the bill and put it down on paper as we have seen, and quite another thing to have enough staff and enough of a data base and computer capacity and all the other things to go with it to really get that kind of thing done, so I am wondering what sort of appropriations there are toward such things and whether we have made any kind of estimates as to what a minimal program might look like in terms of staffing, given the number of communities and complexities of the Basins that

are involved and so on. I think that is a rather rhetorical question. I am just asking the world, I do not think anybody has the answer.

Comment - Dr. Maurice K. Goddard)

Well, we are talking a lot of money if we do this job properly. Senate Bill One that the General Assembly is debating, they are talking about an appropriation for the first year to get the program started at 3 million six hundred thousand dollars. Now I try to argue the General Assembly out of that kind of appropriation. Today I do not think we can spend that much the first year because we have to start out with rules and regulations to be adopted by the Environmental Quality Board, which is the first point of their recommendation at the state level to have a single state agency to adopt the standards and set up a regulatory technique. That will be the Environmental Quality Board under Senate Bill One. They have a 26 member advisory committee. If you read Senate Bill One it includes boroughs, associations, townships and everybody that is involved. The Department is going to have to work with them plus community affairs to adopt the rules. You have to publish them in the Pennsylvania Bulletin, there has to be hearings, and we are talking about a lot of money, if we do an adequate job of regulating the flood plains.

Comment - (Dr. Keith Muckleston)

I would think the funding would remain the same for the next few years, at least. That is why we had to couch the language the way we did in number 5 to say, provide appropriate support to the states because OMB is categorically opposed now to continuing Title III programs. I hear lots of talk about the possible effectiveness of block grants, but I question whether states and localities will use monies in block grants for flood plain management purposes.

Comment - (Dr. David Allee)

Maintenance of and administrative programs to keep track of these things is an expense of such an approach. It would seem like a Section 73 project could well be designed around these kind of requirements. Now I am not sure that anyone who wrote Section 73 had that in mind, but it is a logical extension to the words that are there.

Comment - (Dr. Keith Muckleston)

Your point is well taken. I believe that is one of the reasons OMB is opposed to Section 73 as it now stands because they feel it could have severe ramifications in the budget process: particularly 80 percent funding of nonstructural approaches, including the purchase of land.

Comment - (Dr. Maurice K. Goddard)

I would like to ask a question, Keith, maybe it was debated yesterday or other times with the Council, that very first recommendation, there has to be a point of coordination at the national level. Who talked about how to set it up or who would be the chairman of what agency? I agree with that recommendation, but who is it going to be? How do we get it started?

Comment - (Dr. Keith Muckleston)

Originally it was to have been the Water Resources Council. This is unacceptable to some of the member agencies. Right now nobody has the appropriate authority to do it unless it would be OMB. There are a couple possibilities. A lead agency could do it. Of course, that runs into difficulties immediately because several of the agencies want to be the lead agency and none of them want to follow. If the Department of Natural Resources became a reality it would be the one to do it. As it is left now, the recommendation does not speak to who will do it, therefore, it is really in some respects a meaningless recommendation, unless you can recognize it in a backhand way of saying there is nobody that can do it now.

Comment - (Dr. Maurice K. Goddard)

Do not go away. Anyone, Tom, do you have any questions? Do not be afraid to ask questions, you have a real expert here now, he also is leaving the job, so he will be more frank. He has been very frank as it is.

Comment - (Unidentified Person)

The question was in regards to OMB funding to assist implementing recommendations for state action.

Comment - (Dr. Keith Muckleston)

I really find it very difficult to answer. As you know, OMB is opposed to the continuation of certain types of funding that would assist the states in planning water resources. The Interior and Insular Affairs Committees are very sympathetic to continuing Title III and to increasing the appropriations. Other than possible large block grants that can be used for many different things, I am not aware of any potential sources, but I do not feel very well qualified to answer the question. There may be bills in the hopper, or movements afoot that I am not aware of.

Comment - (Dr. Maurice K. Goddard)

In Pennsylvania we are looking to the mapping that is being paid for by HUD and the flood plain mapping the Corps has done which is a complement to what we are going to try to do under Senate Bill One and that is about a 6 million dollar effort in Pennsylvania to start with. We have to find a way to keep those maps moving at a faster rate than dragging it over ten years. We might have to put some state money in that just to move the job along faster. But I would think with that kind of help on mapping there is a better argument that the states and local people ought to try and put some of their own money into the regulatory part and get the job done. But we all need money, there is no question about that, but I think we are also conscious of the fact that not only is this the attitude of the Federal OMB, but the state people are finding it more difficult to finance our programs. As you know we took about a 7 million dollar cut in DER budget for operation and maintenance and if we cannot get an addition to that we are going to have some real serious problems this year. That is why we have added the money and the bills to start, but the dilemma comes next year when the budget office of my state will say, Goddard, you have to put that in your general operating budget for the department and it is no longer a line item. Then it get very, very difficult. So whether we are going to get adequate monies to maintain the thrust of a good flood plain management activity will be evaluated in the '77-'78 budget rather than the '76 budget. That was a very difficult question and I do not know how you can really answer whether we are going to get the money or not. One or two more questions. We would like to cut this off at about 2:00 if we can. Yes, madam.

Question - (Unidentified Person)

Question relating to Senate Bill One.

Comment - (Dr. Maurice K. Goddard)

She is talking about the state's proposed bill.

Answer - (Dr. Keith Muckleston)

The Executive Order 11296 would direct Federal agencies to take cognizance of flood hazards and behave accordingly in the siting, construction, loans, grants, and sales of Federal property. As I pointed out earlier, the compliance with EO 11296, which was promulgated in 1966, has not been outstanding. I think that the GAO report may well galvanize some of the laggards into action.

Comment - (Dr. Maurice K. Goddard)

It would be our intent that they would be regulated under this bill and the Public Utilities Commission would be represented on the advisory committee to DER, to get the input of the utilities, whether they are railroads, or electrical utilities. That is one of the reasons that the utilities saw to it that they were named in the advisory committee to DER. Any other questions? Yes.

Question - (Tom Bresenhan-SEDA-COG)

Question - what do you see in the future for WRC?

Answer - (Dr. Keith Muckleston)

The Principles and Standards were published two years ago, and since that time there has been considerable effort by the Council and member agencies to write up rules and regulations that will be in compliance with the Principles and Standards. Thus far the SCS, the Corps, and the Bureau of Reclamation have submitted tentative regulations which are now being appraised by the other agencies and by each other. SCS has had theirs in for over a year. The Bureau and the Corps turned theirs in within the last month. We have to understand that these are tentative and it's going to take a great deal of adjustment. There is a great deal of give and take going on right now over how well or how closely their operating regulations should be in accord with the Principles and Standards. I did want to mention in regard to the Principles and Standards that once these are implemented that flood plain regulations should be given a boost. I would think regulation would be given a boost

because the Principles and Standards will require decision makers and planners to consider the full range of alternatives both in regard to national economic development and environmental quality that each one of the actions would have. Therefore, open space uses of various types and flood plain regulations may well receive more attention than they did under the earlier methods of appraising projects.

Question - (Tom Bresenhan-SEDA-COG)

Question - who keeps track of persons managing the flood plain management programs?

Comment - (Dr. Maurice K. Goddard)

What is your prediction?

Answer - (Dr. Keith Muckleston)

In regard to the ability of the Council's mechanism to solve these problems, I would think that the National Water Commission's recommendations (made 2 years ago, and for the most part assiduously ignored both on the hill and in the executive branch), should be carried out in that the Director of the Water Resources Council should be upgraded to at least the level of Assistant Secretary and that the Chairman of the Council become independent and be put directly under the President, instead of being in the Department of the Interior where he now is.

Comment - (Thomas C. H. Webster)

He is not in the Department of the Interior.

Comment - (Dr. Maurice K. Goddard)

Secretary of the Interior is Chairman of the Water Resources Council.

Comment - (Thomas C. H. Webster)

He is the Chairman of the Water Resources Council but the Water Resources Council is not part of Interior. It is an independent agency.

Comment - (Dr. Maurice K. Goddard)

Yes, but he is hired by the Secretary of the Interior.

Comment - (Dr. Keith Muckleston)

Well, it may be independence in name, but everything has to go through Interior.

Comment - (Dr. Maurice K. Goddard)

He's hired by the Secretary of the Interior.

Comment - (Dr. Keith Muckleston)

I believe that the Director reports to Jack Horton who is the Assistant Secretary of Water and Power. By making the Chairman independent of the various operating agencies, we might see better coordination and by upgrading the Director he would have a stronger voice in his attempts to coordinate the agencies. As it stands now, the agencies will coordinate if they choose to coordinate. In the number of instances, it's agency targets and concerns first and Council concerns second. So when you operate by consensus and have ten different agencies involved, you can imagine that significant steps in flood plain regulation may well be very difficult to take, because any agency that feels its program threatened has in fact veto power over the action.

Question - (Tom Bresenhan-SEDA-COG)

Question, does flood plain management include the management of the agencies?

Answer - (Dr. Keith Muckleston)

No, I would not think so, I think the agencies are the ones who are going to do it. It would depend on how well they are coordinated and what incentives they have to carry out various aspects of flood plain management. Right now it is very decentralized.

Comment - (Dr. Maurice K. Goddard)

But if your question means that we set up regulations and the DER wants to build something there, certainly

we have to abide by those regulations. I do not know whether that is what you mean.

Comment - (Tom Bresenhan-SEDA-COG)

I think one of the problems here is managing the managers. Dr. Muckleston's talk showed this very well.

Comment - (Dr. Maurice K. Goddard)

We are getting warmed up now, Mr. Webster.

Comment - (Thomas C. H. Webster)

Let me read to you P.L. 91-575, I think this is a misconception. I too would like to think that the Commission had the authority to act but it says here . . .

Comment - (Dr. Maurice K. Goddard)

What he is looking for is the veto, it is under the flood control section.

Comment - (Thomas C. H. Webster)

Well, right here we are...the Commission shall regulate the use of the particular flood plains in the manner and degrees necessary for the factors enumerated in this subsection, but only with the consent of the affected signatory states. You might as well throw it out of the book.

Comment - (Dr. Maurice K. Goddard)

Well, there is a long history to that. If you did not have that in there you would not have a Susquehanna River Basin Commission. It would never have passed in the three states, it might have passed one or two but not all three. I still think the principle of the states trying to do the job before we pass it up the ladder is still the right way to do it. That is what we are doing in water quality and other types of activities, with air quality the same way. Now if the Commonwealth of Pennsylvania did not enact a flood plain management bill then I would think that the Commission ought to do it first. Failing that, then maybe the Commission ought to do it. That is the basic history

of it. If that had been a mandatory item and I think you can see the attitude and difficulty in passing these bills in the legislature, why the Commission document itself would not have passed. Do you want to say anything more?

Comment - (C. Peter Carlucci, Jr.)

Your Commission has not been sitting around, your Commission has taken a lead in the flood plain mapping under the FIA program and is now getting a few communities in the program throughout the Basin, and we have cooperated with Pennsylvania DCA. We have heard some discussion on the standardization of flood questions. I think this Commission has taken a lead by forming a Hydrology Subcommittee within the Basin which will lead to such standardization of questions.

Comment - (Thomas C. H. Webster)

Is he a lawyer or a PR man?

Comment - (Dr. Maurice K. Goddard)

He is both. You know it is a terrible dilemma that all of us who have worked in government, at the Federal or state level. I received a terrible letter this morning before I came over here about a gentlemen complaining about DER's attitude on some land fills. The General Assembly passed a really stringent bill or Act 241 some years ago in Pennsylvania and DER is now trying to regulate the land fills and we stomped on some people in a particular county, now a legislator does not want that. He wants that land fill to continue being a pollutor, and of course we cannot agree with this so you only move as fast as the regulatory process or as we get the public to support the General Assembly. You try to get ahead of that process and it will never succeed. So I think the process that we are trying to follow here is the right process. It is even tough enough to do it when you go through that chain of command, but if you try to start from the top and bring it down, then you have revolution. Do we have any other questions, it is 2:00.

We have two more big items. Keith, we really thank you. Sorry I cannot go to Oregon with you, I like the State of Oregon. If you ever want to come back to the east let us know, maybe we can find a slot for you in Pennsylvania.

We are a lot easier to get along with than those Feds. That ought to keep them awake around here. We all ate too much, but that will wake us up. We were really pleased to have you and Rosemary. We appreciated your comments. The next item is flood forecasting and warning. Wayne DeMoss of the staff will present this item for us.

Comment - (Thomas C. H. Webster)

Mr. Chairman, may I please just say something on this particular subject, on flood forecasting and warning. I think people have gotten tired of hearing me pounding on the desk. Last February we had a presentation from a hydrologist with the Weather Service. At that time I voiced particular concern over the extent and the completeness of our flood forecasting system, in relation to what we had been led to believe we had and what we felt the presentation we were actually getting. I recently had a meeting with NOAA and USGS in Washington and I will say unequivocally right now that this Basin, as far as I am concerned, has one of the most progressive and ongoing, and one of the most well-backed flood warning systems in the United States and now you can contradict me on that if you want to, but I have been extremely pleased to see actually what has gone on. What we have gained because of the interest of the Commission and the willingness of the agencies like Norm Beamer's USGS shop and the others down in Reston and certainly the weather arm of NOAA and the way they throw themselves behind it. I think we really have been able to show results to the people of this Basin, and I am very proud of it.

Comment - (Dr. Maurice K. Goddard)

Thank you, now if they get that emergency system.

Comment - (Thomas C. H. Webster)

I am glad you brought that up.

Comment - (Dr. Maurice K. Goddard)

Is that thing operational now?

Comment - (Thomas C. H. Webster)

It is not operational, but I understand construction will start on September 1.

Comment - (Dr. Maurice K. Goddard)

We are going to have a big champagne dinner when that is finished.

Flood Forecasting and Warning - (W. Wayne DeMoss)

Needs

The fourth need we are going to explore today is the need for the expansion and improvement of the flood forecasting and warning system in the Basin. Briefly, we are going to examine why the system is needed, what are the general objectives of needs in terms of improving the system, and what are the major components of the system and how can it be improved.

As we have previously heard, there are over 1,300 flood prone communities in the Basin. These areas contain the majority of the Basin's population, industries and commercial establishments. Therefore, the flood forecasting and warning system is needed to warn and evacuate these areas in times of emergency for two purposes: to save lives and to reduce losses from floods.

What are the general objectives of need in improving the system? The first is to insure that the system is in a continuous operational order; secondly, that it utilizes the advances being made in forecasting procedures and equipment; and thirdly, that the system expands its area of coverage and affected population. Finally, all of these items would be designed to maximize the system's accuracy reliability and warning time.

The basic components of the system are threefold: 1) the collection of weather and stream flow data; 2) the preparation of forecasts and warnings; and 3) the dissemination of the forecasts and warnings, a most critical component of the entire system as we discovered in 1972. Each component is an integral part of the system and each involves the transmission or communication of information.

The river and rain gages are the primary source of data, and the specific steps which should be taken toward improving this part of the system should be evaluated on the basis of four factors. The location and design of gages, to insure that readings will be available under flooding conditions. The extent of the adequacy of the system, in terms of the number of people for whom forecasting coverage is possible. The frequency and reliability with which stream flow data is collected and transmitted to the Forecasting Center, and the need for a backup data collection system in case the regular system fails.

There are other items that are needed to insure that those communities located between forecasting points have available some reliable basis for relating upstream and down-

stream conditions, and forecasts and warnings, to their situation, so that they may assess their situation and react to it. In addition, forecasts and warnings are needed for smaller watersheds subject to flash flooding.

In summary, there are two basic activities which would work to insure that the Basin's flood plain residents have the benefit of the most effective and reliable forecasting system. They are the identification of incremental additions and improvements in the system's equipment, and the continuous commitment to maintain the public understanding, receipt and utilization of flood warnings.

The preparation of forecasts and warnings is the responsibility of the National Weather Service. With us today representing that agency is Mr. Allen F. Flanders, who is the Assistant of National and International Affairs for the National Weather Service in Washington, D. C. He will talk about the improvements in the system. Mr. Flanders.

Flood Forecasting and Warning - (Allen F. Flanders)

Presentation

Thank you Wayne and Dr. Goddard. I want to thank Commissioner Webster for his kind remarks about where he feels the Weather Service has been improved and where we are going in our collection and dissemination of data, and where we can take appropriate action on the part of your overall program of flood plain management and protection. It is a pleasure to be here and to participate in this fine program.

I am going to discuss some of the areas of concern for the SRBC. We have a program where we collect data on rainfall using radar and satellite dissemination of data through mini-computers. We can get a feel for mini-computers by going to the hardware store and getting a mini-calculator for 19.00. These are the devices today that are making it feasible to do the things that we could not do 20 years ago. We will start with our radar program to show you what is taking place in your National Weather Service. Radar came into being for weather purposes during World War II and shortly thereafter we had several devastating hurricanes that went up the East Coast; Hurricane Connie and Diane in particular, and it was at that time Congress felt the need to fund a modern up-to-date weather radar system which would give us the ability to estimate precipitation. With that type of radar we could identify the most horrible of all weather events that we know about, tornados, as radar can track them. More important, with the device that we have

on our radar system a man can sit at a console, analyze the storm intensity, project where it is going to move, take this information and put it on a telecommunications device and transmit the information to a user. Most of the users today are in the aviation areas but the thing that is important to all of us here is the precipitation.

With electronic devices over the past few years, we have been able to analyze the weather echoes that are seen on the radar scope. Echo contours in several levels increase in intensity toward the center where most of your vertical velocity or heavy rainfall comes from. We can by using mini-computers analyze this. We can put numbers on the contours, and those numbers can be interpreted as rainfall, and with this device and the mini-computer, you can estimate the amount of rainfall in any Basin. We can do this down to a square as small as 2 x 2 square miles. We have a program underway in the southwestern part of the country where we have four of these systems actually operating on a quasi basis. We are now moving ahead and with funding coming up, we will be able to procure systems for each key radar, and we have some fifty scattered across the country and all of Pennsylvania happens to fall under the umbrella of one of these radars. This will allow us to estimate the rainfall amounts.

The next step in our process is modeling. We heard some of it this morning, the Corps was talking about reservoirs and what happens when you release the water to make sure you do not manufacture a flood because water is a controllable factor to a certain degree where you have reservoirs. Outside of the reservoirs, the Weather Service is involved in forecasting information to the public so we have to coordinate with the Corps, the USGS, to make sure that these things are properly known to the people. In our forecast centers we have computer systems to do most of this work. Now the heart of all of this is the data collection system. As you have heard this morning from Wayne, the collection of data and the dissemination of a forecast product are key elements. In our automatic hydrological observing system, we have three basic modes that are collecting data. We have the national responsibility for forecasting for over 2,000 communities across the country. To collect the data and to provide the forecast for the 2,000 communities, we have three basic systems which are now being implemented. One uses the telephone system, another uses the satellite, and the third uses land line radio. I say land line radio here because I am talking about point-to-point communications, not being relayed by satellite or through a radio relay tower; two points

in communication with each other. Each is used where economical for the community. The radio system is simply a matter of having a VHF, a very high frequency radio pointed at a hillside with a river gage, a cable going down to the river gage or a precipitation gage attached to the radio. You can either interrogate the radio or you can have a timing device on it which will transmit whatever observation data it has. This information is then relayed back to the forecast center.

The other system that we have, and this is one that we have more of than any other at the time simply because it is the least expensive, is making use of the automatic dial telephone system. Here we can take a device, a simple telephone, and by acoustical couplings to the telephone, we can go through a mini-computer system at strategic locations through the country. One phone call to the mini-computer and it will be programmed such that it can call all the stations automatically. If there is a busy signal, it will call back. If it is not busy, it will then make a telephone call to the forecast center and all the data will be printed out. So instead of a forecaster or an observer having to manually dial each station, or wait for an observer to call in, all he has to do is place one telephone call and the whole thing is done automatically for him within a matter of minutes. The longest time in making the telephone call is his dialing. The connect time is 1-3 seconds. Within the Susquehanna River Basin we have some 28 of these systems now installed or being installed. There are approximately another 28 that are planned for installation and these additional 28 are dependent upon future budgeting. So within a matter of a few years we would hope that over 50 of these automatic telephone dialing systems will be in operation in the Susquehanna Basin.

In addition there will be some satellite data collection platforms. Now the Commission, as I understand it, is in the process of procuring a number of satellite data collection platforms. These will be such that they can operate either with the GOES satellite which stands for Geostationary Operational Environmental Satellite - - it is a long name for a satellite that is synchronous and I will tell you a little bit more about that in a minute - - or it can operate through another polar orbiting satellite called ERTS, and I think maybe you people may have heard more about the ERTS satellite because it has been up longer. ERTS stands for Earth Resources Technology Satellite. The GOES satellite is always in the same position around the earth; that is, it rotates the same revolution of the earth and you will always have the same picture. It is located at an altitude of 22,000 miles. With this satellite you can get a global

picture. When the satellite is centered over a certain point of the equator, it has the capability to collect data over North and South America. For data collection one satellite will cover all of the continental United States except portions of the Hawaiian Islands and Alaska, but NOAA has plans to launch the second satellite later which will give coverage for all the Atlantic, Pacific and overlapping coverage for the United States. If either of these fail, the other can provide back-up. We also have plans to launch a third satellite later.

Data can be collected from other stations that have environmental impact; for example, a tsunami when you have an earthquake. Information of this type can be acquired through specific relays to collect weather data, from ships at sea, buoys in the ocean which will radio their location, oceanographic data, all of this can come back through the satellite into a command and data acquisition station. A satellite data collection platform has an antenna and below the antenna is actually a solar cell panel. This is where we get the electricity to run the system independent of A/C power and we have solar cells to provide trickle-charge to a battery. The batteries last approximately a year without replacement, using the solar cell system. All of this data comes down to the Wallups Island readout station in Virginia. This data is then relayed back to Suitland, Maryland and will be made available over a system which will tie this whole thing together. Most of the first procurements we made are going into the Pacific Northwest, Columbia Basin. This is an interagency cooperative program. NOAA is working with the Corps of Engineers, Geological Survey and Bonneville Power Authority. The second procurement is in the mill now and delivery of the system will start later this year and some of these units may be placed in the Susquehanna Basin.

We have talked about collection of data. Now what do we do with the data once we get it on the ground? We have another system called AFOS which stands for Automation of Field Operations and Service. This is the system that is going to help the man in the office. So far everything we have been doing is outside of the office, now we are moving into the office. What can we do with the person who is going to take care of all of this? We have a people crunch. We have not been very successful in getting more people in the office. There is more or less a lid on Federal funds so what we have tried is to have machines do the work, as part of the effort to keep the Federal spending under control. So with this equipment, the idea is to acquire data faster, make the forecast sooner, get the information out as quickly as possible

for the people to take protective action. This information is not only just for the hydrology river flood forecasting, it applies to all weather services across the board. If you have ever been into the Weather Service Office you would perhaps be amazed at the reams of paper that are hanging on the board, all the types of weather charts and a whole battery of teletypewriters clicking away. This will be replaced with a computer console. A man will have a TV display type console in front of him, and all of the information will go into that console. He can save what he wants, program what he wants, program it to transmit what he wants without having to go through reams of paper.

Now this is all going to be linked together by what we call a National Digital Circuit. This will have the capability of digitally transmitting data at a fantastic speed. Those of you who are in computers where you have 4800 BAUD know you can transmit about 1200 words per minute as compared to what we are doing today at 100 words per minute. Now off of that National Digital Circuit, we are going to have smaller circuits that will go to our smaller offices so that anybody that has a party line telephone can have one of these systems. All you have to do is pick up the phone and dial it. Here in Harrisburg, there will be a system at O.D. White's River Forecasting Center, and he will have the console that will have the capability of transmitting this information. This work horse console, so to speak, will have reels of tapes on which we can prepare messages, put them on the tapes, you push a button and it goes into the system and is disseminated into any office that has the need for the data. The forecaster who has the responsibility of preparing the information will have a console in front of him and all of the old reams of teletype and weathercharts are replaced by screens. So he can call for any information and look at his weather charts, overlay them and prepare his forecast. Once this information has entered the system then the user, and this can be Federal agencies, state agencies, news media or anybody who has the capability of having a connection into the system. It is not necessary to have a console - they can simply have a CRT, a television type of display or they can have a printer which will print out the information they need and the beauty of the system is that this is all programmed so that if you only want the forecast for the Susquehanna River Basin, you do not have to get all the State of Pennsylvania, or the ski forecasts in the State of New Hampshire or Sun Valley, as it is today with most of our teletypes. It is difficult to program all of the information. With this system you will have the capability of receiving what you want. Out of this system will come more timely forecasts and warnings for all the public.

This is a \$40 million dollar system that is being implemented across the country. It is going to pay for itself in seven years. By transferring over to this system, we will transmit more data in less time and it is going to save us money. The system is designed. It got approved by the Office of Management and Budget because it is going to pay for itself in six or seven years, because of the greater productivity and not having to have additional manpower in the office. So sometime in late 1976 there will be some equipment starting to appear in Pennsylvania. The first office to receive it will be Pittsburgh. Harrisburg River Forecast Center is next in line to receive this equipment for improved forecast dissemination and warnings. This concludes my talk.

Comment - (Dr. Maurice K. Goddard)

Very fine, thank you very much, Mr. Flanders, very interesting. I am sure there will be some questions. Wayne, do you want to make the assessment?

Flood Forecasting and Warning - (W. Wayne DeMoss)

Assessment

From the report we have just heard it would appear that improvements in the area of flood warning and forecasting are well ahead of the efforts in other areas of concern under discussion here today. Actually the NWS program involves the cooperative efforts of several agencies, namely, the Weather Service, USGS, the states and SRBC. Examples of this cooperative effort are evident in the 1) several new gages established by USGS, 2) the emergency power system to be installed by GSA at the River Forecasting Center in Harrisburg, 3) the planned installation by NWS of a radar system for our area, and 4) the utilization of the 21 GOES data collection platforms to be added over the next five years which will hopefully surmount the obstacles and uncertainties of data transmission by telephone and will provide more frequent stage readings.

The installation of additional or technologically improved gages will be restricted, however, by budget constraints of supporting agencies and changes in the priorities of the agencies' programs. Care should be taken to insure that such factors are not allowed to diminish or restrict the operational capability of the overall system.

We are anticipating that, in regard to the basic forecasting system, the Commission, USGS, National Weather Service, and the states will continue to cooperatively evaluate the existing data collection and communications network in order to recommend and implement necessary measures for improvement.

Since the specific problems which face small watersheds are a function of each watershed's particular characteristics, the responsibility for providing adequate warning is less clear cut; however, the National Weather Service, the states and the Commission have responded in helping in the development and implementation of self-help forecasting and warning systems for one watershed in Pennsylvania and are working on two additional systems in New York. This is a good start but more localized systems are needed.

The value of the data collection and transmission equipment and the expertise and energy of the several agencies staffs cannot be fully realized without benefit of an active civil defense or local agency program which keeps flood plain residents and property owners alert to the possibility of flooding, and prepared to take necessary action to minimize damage and loss of life in the event of a flood.

Comment - (Dr. Maurice K. Goddard)

Thank you, Wayne. Yes sir.

Comment - (Unidentified Person)

Commissioner Webster, at the last meeting of the Commission you indicated your concern over the manner in which the Weather Service was going to divide up the Basin in terms of obtaining its data and that is when you indicated you were going to examine that or try to get more information.

Comment - (Thomas C. H. Webster)

This is what Mr. Flanders has just explained to us. This is what I was objecting to, that it had not been explained heretofore despite the request to do so, but I think it has been very carefully and very clearly explained and I think I would also point out and, Allen, you correct me if I am wrong, this does not take the local observer off the scene. What we are getting for our money here is a

vastly expanded, much quicker system than we do have right now.

Comment - (Unidentified Person)

You are then withdrawing your initial reservation?

Comment (Thomas C. H. Webster)

I am absolutely, positively. However, I will watch these programs carefully.

Comment - (Allen F. Flanders)

I would like to make one point which I did not cover before, that Commissioner Webster raised and I think it is an appropriate one. We talk about cooperative observers, we collect data from over 7,000 points across the country and well over half of these are private citizen type cooperative observers who really get no pay. But this is a mobile society that we have and thirty years ago people did not go out every night and they did not move every two years, and abandon property, and this is what is happening. We cannot go back out when an observer moves and readily find a replacement and in this program we are not doing away with the cooperative observer, all we are trying to do is strengthen our network and make use of modern communications systems to acquire the data faster in order to feed the computers who can make your forecast ten times faster than we could before. You put this into the system so the people can get the warnings to take the appropriate action, we are not in any way eliminating the observers. Wherever we have them, we are glad to have them.

Comment - (Dr. Maurice K. Goddard)

Yes sir.

Comment - (Unidentified Person)

Previously or at present, you have permanent documentation of everything that is transmitted now with your up-to-date system. This will no longer exist, is that true?

Comment - (Allen F. Flanders)

It will be on magnetic tapes and this information will go into our national records center in Asheville, N.C. The data will be saved.

Comment - (Dr. Maurice K. Goddard)

Yes, Madam.

Comment - (Unidentified Person)

With this ability to pick and choose out of the system, is there still a danger of a sudden event that nobody can really anticipate, some kind of air movement that seems to come out of nowhere?

Comment - (Dr. Maurice K. Goddard)

You are talking about surprise storms and this type of thing?

Comment - (Allen F. Flanders)

Well, yes they still happen and probably always will happen. The things we are attempting to do with the systems that we have like satellite imagery, for example, we have a far better handle on hurricanes. Hurricanes, as many of you may know, start on the West Coast of Africa as little eddies and they work their way right along the equator until they get to the East Coast and then they develop into tropical storms and from there into the hurricane stage. With the satellite we can track these things and as they get closer into the land, then the radar can pick them up. With the radar now, we can actually collect the amount of rainfall. So we should be able to do a better job but I am not going to stand here and say we will not escape some sudden event at sometime because they happen. You just cannot instrument an area sufficiently to cover all circumstances.

Comment - (Dr. Maurice K. Goddard)

Tornados, for example, is one that would be tough to forecast.

Comment - (Allen F. Flanders)

Yes, I am just speaking mainly here of flood problems.

Comment - (Thomas C. H. Webster)

You cannot pick up the germs of a tornado?

Comment - (Allen F. Flanders)

Tornados come out of Mother Thunderstorms. This we know, but there is a lot of research going on. There is no answer at the moment. They are still researching it trying to get what they refer to as a signature. We know the hook echo is very definitely in the signature of a tornado, but when you see the hook you have got the tornado. You cannot help the poor guy here, but you can help the guy down at the other end.

Question - (Unidentified Person)

Has the accuracy of the system increased significantly over what is presently being used?

Question - (Allen F. Flanders)

When you say accuracy, do you mean forecasting?

Comment - (Unidentified Person)

Reliability.

Answer - (Allen F. Flanders)

Reliability and what we are doing here is acquiring the data faster. Now it takes us three to four hours to collect data in many of our forecast offices. With this system, we should be collecting the data in less than an hour, so you have reduced your data collection time by several hours and you can turn that around and have that into advance warning time. At the same time we are now introducing a new river forecast model, in the forecast centers. The model is expected to be more efficient, and faster. We have had this model in operation now in the lower Mississippi and it has been very successful.

Question - (Dr. David Allee)

What does this do for the Swatara Creek situation, the kind of self-help program that Wayne mentioned?

Comment - (Dr. Maurice K. Goddard)

Better mention where Swatara Creek is first. It is a little tributary by Harrisburg.

Answer - (Allen F. Flanders)

I might have to defer that to O. D. White and you are now getting down to some nuts and bolts that I am not familiar with. O. D.?

Comment - (O. D. White)

That program has been in operation in other areas too. The idea being that there are some streams that are so small that by the time the information is collected to get to us they are already wading through water. What we are trying to do here is to furnish them with the equipment, rain gages, river gages, so that some local groups and in a manner of hours or so before the event, maybe you cannot save much, but you can save your car, your life. So with the sophisticated system we have here, the only feature that the Swatara Creek would have would be the radar coverage plus the very rapid collection of rainfall that we would have. This would help some, but the answer still is, and this is something we continue to stress, you have got to have something done at the local level. It does not make any difference how good our forecasts might be; if you do not do something about it, it does not help.

Comment - (Dr. Maurice K. Goddard)

Very good, any other questions? You did a very fine job, we appreciate you being with us. Thank you very much.

Emergency Measures - (Mary Ellen Barnes)

Need

The final activity which completes the outline of a comprehensive flood plain management and protection program is the development and implementation of emergency measures designed to reduce loss of life and property damage during a flood. Such measures include communications, evacuation, and provision of food, medical care, clothing and shelter.

These measures become necessary when floods unexpectedly overtop banks in communities with little or no flood protection which has been provided.

The values of a flood forecasting and warning system and emergency preparedness plans are interdependent. The operation of emergency plans depends upon the warning system for fast and accurate information on the flooding situation. The forecasting and warning system is all but wasted if the community does not comprehend the warnings and is not organized to take appropriate action.

It is imperative that delegation of authority, identification of resources and establishment of operations plans be accomplished prior to any actual natural disaster. The aim in the development and operations of emergency plans should be to utilize the limited time, manpower and resources in the most effective and efficient manner to reduce the danger and inconvenience caused by flooding. This requires extensive coordination among the different levels of government, and between governmental and private agencies to facilitate the carrying out of emergency plans. It is necessary to develop a regular program of education, training and testing at the state and local levels so that agency personnel and volunteers can maintain a close knowledge of the plans, procedures and equipment. To discuss the assistance programs and communications systems that are available through the Civil Defense Preparedness Agency, I would like to present Mr. John Bex, who is the Regional Director of DCPA, Region II, which includes Pennsylvania and Maryland.

Emergency Measures - (John Bex)

Presentation

It is nice to be here. I'm going to make a proposition with you all, I realize the time of day it is and I know

that I have got an hour message to give you. I am willing to cut it to one quarter if you'll stand up for about two minutes and get that arterial blood flowing and then we will get underway.

Comment - (Dr. Maurice K. Goddard)

Good idea.

Comment - (Robert J. Bielo)

Very good.

Presentation Continued - (John Bex

Two minutes are up, we are on your time. As some of my fellow Washingtonians have commented to you today, I too, am glad to be here but for three different reasons. In the first place, I live in Mechanicsburg, Pennsylvania on weekends, and it is good to be home an extra day or two with my wife. Secondly, as many of you from Washington know, a day away from Washington these days is like a month in the country, and this is my month in the country; and thirdly, the rare opportunity and privilege to talk to the grass roots, to Federal, state and local employees about my favorite subject, Civil Defense. Now I am not going to say, like some of my advance speakers, that my boss was sorry he couldn't be here; it is self evident. If he were sorry he would not have sent me. You decide why he sent me when I am through. I represent the Defense Civil Preparedness Agency; have you ever heard of it? How many have? Hold up your hands please. Wonderful, I have a friendly audience. Actually the Defense Civil Preparedness Agency formerly was the Civil Defense Agency, and the Civil Defense Agency, prior to '72 was in the office of the Secretary of the Army. That great Secretary of Defense, Mel Laird, thought we needed more visibility. He thought we needed more flexibility, he thought we needed a better working relationship with our peers, and he also said maybe it will be easier to fund, so he got rid of the Office of Civil Defense in the Office of the Secretary of the Army, disestablished them in the vernacular of the bureaucracy and established a new agency under the Department of the Defense, the Defense Civil Preparedness Agency with my boss, a great guy, John E. Davis, reporting directly to the Secretary of Defense. Now the reason I give you this background is because our agency needs visibility and I am getting it right here today. You will see

why we fit in because our mandate by law is nuclear. All the monies that are voted for our agency by Congress are for nuclear potentialities. We are guided by Public Law 920 passed in 1950, and this has to do with the minimizing of loss of life and property in case of a nuclear disaster. When my boss came aboard, he realized that trying to sell Civil Defense was about as tough as trying to sell cancer. But we had a market problem, you know, a service or a package that was acceptable to the public and to public officials, and he said, "If we can find a better way of doing this job, maybe we will be able to market it better".

In January of 1972 he had a letter of exchange with General Lincoln, head of the Office of Emergency Preparedness in the White House giving us the responsibility of working with the state and local governments in reference to planning and preparing for natural disasters along with nuclear. That makes good sense, doesn't it? I like to say that my boss, John Davis, came to Civil Defense and found a lot of nonsense and some sense and is striving to bring common sense which is your folk wisdom to the Federal government and it is not easy, as you heard some of the speakers say.

Okay, we have got the responsibilities that the states and local governments had for some time, preparing for natural disasters along with out nuclear responsibilities. There is a similarity in preparation, not identical, but you do have to plan for the accident. There are going to be fires, destruction, theft, floods in connection with a nuclear or in connection with a natural disaster, and this takes some planning and the results afterwards are similar. Now when Bob asked my boss to come, whom I am pinching for, he said I would like for you to talk about what Civil Defense has been doing since Hurricane Agnes or since Tropical Storm Agnes and about your communication systems, but I felt that it was important that you know a little bit about our background as to where we are and where we are going; and now we are going to proceed on the basis of tell me quick and tell me true not so much how it came to be, but what we are doing for the people in Pennsylvania which is what counts.

In reviewing the Federal program, John Davis found that in order to qualify for Federal funds local governments had to put X's and squares on a paper called a program paper. And he knew that these program papers were filled in by people who tended to be over-ambitious, who tended to fudge a little, who tended sometimes to put the wrong X's in the wrong squares just to qualify for Federal funds.

And this was a very critical piece of paper because it said that this community, at a given time based on a given type of disaster, could bring to play these human resources and these material resources to minimize the loss of life and property. His gut reaction is "I am from Missouri", (he is actually from North Dakota). He did a survey of 160 of these program papers out in the Northwest, and he found that he was absolutely right. And there arose his process called on-site assistance. We have been on on-site assistance since Hurricane Agnes in Pennsylvania. What is on-site assistance? It is kind of what some of you have been talking about all day. We go to the local community, to the Mayor, to county commissioners, and discuss a profile of their disasters that have occurred in the last 100 years. Let me deviate, I was visiting with the Mayor of Martinsburg, West Virginia. Mr. Masland, in May of 1972 did you know their profiles for disasters in the last 100 years was zero? The Mayor had never had in his community, a disaster for 100 years. And also he found that there were no commercial airlines going near Martinsburg and no major highways going through it and no industrial plants, so why should he be concerned about preparation for disaster? He was courteous, he was pleasant and he listened, but he really wasn't interested. But in June of 1972, one month later, 100 families got their feet wet in Martinsburg, West Virginia, for the first time in 100 years. And they were really interested. This is us all over again, isn't it. This is the value of on-site assistance. We go in on invitation, on a team basis, a Federal, a state and another Federal agency, if the other Federal agency is available and we are talking about NOAA, we are talking about the engineers, and evaluate with the key public officials what they consider their disaster responsibilities are. And it's quite interesting. Can you imagine a community where you have a strong police chief and a strong fire chief who both assume they have the same disaster responsibilities. There is a third disaster in the making.

Let me tell you another true story. I won't name the state, but it is nearby. We were re-evaluating with the public health department what happened when they have something go down on power like the good Colonel knows I have it in my headquarters every now and then. He said, well, we are going to need an emergency generator in case we have our power go down, but we have this worked out, we have out arrangements with Harry Clendennon, he has got generators and we are going to get one from him. In the course of the two-week interviews there were two other departments of that local government who were going to need an

emergency generator and were going to have their generators supplied by Harry Clendennon. Now one member of the team had the foresight to say let us visit with Harry Clendennon before we leave. They visited with Harry Clendennon and he was a local official, part time, and he worked for the telephone company most of the time. Yes sir, he had generators and as a matter of fact, he had a working arrangement with the telephone company that in the first 24 hours they would go on batteries and then they were going to borrow his generators. These are the things that you learn as a result of working on an on-site process at the grass roots. Also, the county commissioners and public officials start to think about disaster planning. You have heard of disasters that occur when the Mayor runs away, you have to call the Mayor back. We know all about those kinds of things, but we gain visibility, we gain their attention and this is really important. I remember a situation when I was in the Court House in Moundsville, West Virginia, right after Hurricane Agnes at 7:00 in the evening. Seventy members of that community, all concerned members, were there. There were two commissioners out of the three, and one of them said we will go and get the other guy and they got him. Now the reason they were there was because Hurricane Agnes had resulted in having people with their feet wet, and also they had found that they had a liability in reference to their communications. They didn't have a command and control point where the public officials could eyeball to eyeball with their human resources and they couldn't reach the county lines fast enough. This is on-site assistance process and this is one of the things that we are doing across Pennsylvania, and we have never had a community who felt other than this is a very positive thing to be doing. We tie in other Federal agencies as I mentioned.

Now for a second activity, John Davis has always felt that it pays to be a professional. Across America we have 6,000 local Civil Defense Directors, some are part time, some are full time. Some are paid and others partially paid. Their expertise varies from -0 to 150%. We have a staff project in Battle Creek, Michigan, that we have had for twenty years with a complete spectrum of classes and courses that would provide a person who had the time and willingness to attend, all the information and background for disaster preparedness. We even have courses for public officials. But for some reason or other these local Civil Defense Directors have never managed to get out there. They are too busy, or they do not have the money, they do not have the time and I can tell you another reason that

we don't talk about, they are afraid to go back to school. John Davis says we have to increase and improve the professionalism of the Civil Defense Directors of Pennsylvania and the nation. So for the last period of time since Hurricane Agnes, we've been bringing the mountain to Mohammed. We are holding workshops in Pennsylvania every year. As a matter of fact, last year we had three, this year Pennsylvania surprised itself and have had thirteen and they have gotten the message. They are going to have 67 this coming year. But the point is we are making it possible for the local Civil Defense Director and public officials to learn more about disaster planning and preparation, the ABC's and the refresher courses as well in his front yard, on his front porch. It is difficult for them to turn us down because we do it during the week, in the evenings and on weekends. We are helping Pennsylvania reach improvement in their professionalism.

Now a third activity that is important, I am sure all of you will agree, that for any effort to be successful in our society today, be it in the military, government, and as the great staunch backer of free enterprise, Mr. Frank Masland would say, you have to tell people what you are doing, why you are doing it and what it means to them. That's called visibility. I remember the first time I visited Senator Mathias on a little briefing. I had hardly got in the door, that was four years ago. He said you guys are twenty years behind in your public relations. I visited with him last year and he said you are making some improvement. The day before yesterday, I was visiting with Birch Bayh and his assistant and he said yes, I think you have ten more years to go. But this is very important, we can have the greatest hardware and the greatest systems and the greatest people, but if we do not have public support for what we are doing, we are in for a total loss. Anyone in the communications field today knows that if you are going to get a message across, you tailor it for the specific market that you are trying to reach. Our market, your market, are public officials, the public at large, and the school kids. Those are the three markets that we must reach. We must convince them of the needs and the importance of preparing for disasters. So now the Defense Civil Preparedness Agency, mandated by law for preparation for nuclear, has been able to bend and work, not to break, and make it possible to work for the state and local government in planning and preparing for a natural disaster. I am going to go to the communications and keep my word, but I want to tell you another little story. I was visiting with the Commissioners at Bedford County, Bedford, Pennsylvania, not too long ago and they had decided they

needed an emergency operation center. Now the fellow who represented the state there has been trying to get that message across for seven long years. The Commissioners are made up of two gentlemen, three gentlemen to be exact, two farmers and one businessman, all very conservative and all great guys and they couldn't understand why in the world they needed a command and control point, an EOC and all these additional communications. Then in June of 1972 they got a little bit of the message, you know they got warmed up, maybe that is what we do need, but not warm enough. They did not get done, but in December of 1974 it seems as if they could not get Harrisburg to stop the traffic on the turnpike at the right time and they had 2,000 visitors and they were not in the best position to have them. Aside from that fact, it took them four hours to reach from Bedford to Harrisburg by communications and two hours to reach the county line. Can you believe that, Colonel? This is the real world. To improve on this visibility program, we go to the grass roots. I have an advance guy, she happens to be a gal, I am a militant feminist. She visits with the county commissioners, you know those guys that are so difficult to get any time with, and she tells them about the mission, why it's important to do a little planning and preparing, and invites them to come to our regional center. By the way, our regional center, which is your regional center, is located at Olney, Maryland. That is where two cowpaths cross at a red light. We are in an underground submarine there and I want to extend to all of you a personal invitation to come there. But these commissioners, I'm talking about all three of them, they are now renting busses with your money and they come down and spend a day at Olney, Maryland with us in your Federal center, and I want you to know, they get some education they never had before. They enjoy it and they pay for their own lunches. We have had 20 counties down so far, my advance gal has been to thirty and you know the difference between 20 and 67 and that is what we have got to go and we are going to do it before the end of the year. We talk about all the things you all talk about here. We just do not talk all the time about the Susquehanna River Basin Commission, but it is all tied together, and we invite all of the local counterparts to participate and this is important.

Now another thing we are doing is that we have an automatic typewriter that sends letters out to 2,500 commissioners and mayors four times a year and we welcome a mailing as far as your commission is concerned, sir, because this is the type of thing that these people need to know, just to remind them that the flood that they never had and are not going

to have really could happen.

Well, that's enough for what we're doing in Pennsylvania and across the U.S. Now I would like to cover one other point. FDA, which is Federal Disaster Administration, in HUD as referred to this morning, I guess it was July of last year, I forget the date the law was passed, has a quarter of a million dollar grant which is available to every state for doing an overall disaster planning effort, and it also has a supplemental that goes from 25 or 50 thousand a year for maintenance, making it possible for the states to really get up to date on an overall disaster planning basis. Now even on a prototype some of this money could be made available for a local planning effort. We, as an agency, have nine categorical grants which are direct grants for matching funds such as personnel and administration which is 50-50, such as communications equipment, RADEF monitoring and I might say that RADEF monitoring is kind of old hat, we have to find better uses for our RADEF equipment than monitoring for nuclear fall-out.

Here is something that works with the environmental people. Surplus and excess property, maintenance costs on communications equipment, now what about our communications? I guess I had better start with a story here. I live in Upper Allen Township, that is a budding community over there in Mechanicsburg. Four years ago, the township commissioners, and one of them was here this morning but he left, learned that we were associated with the Civil Defense mission, he said, "Hey, what is that great big yellow blob on the side of the firehouse?" I said that is a Civil Defense Siren, you cannot fool me. Now let me ask you a question. Do you know that up there on your Cheyenne Mountain, Colorado Springs, is the national warning center and you know that Region 2 is one of the links.

There are three warning points in America as far as Civil Defense is concerned, one is Cheyenne Mountain, one is Olney, Maryland, where you are all going to come for a visit, and the other is Denton, Texas. I said, so we get the message from Cheyenne Mountain and it is 30 seconds to Olney and we press the button or pick up the phone, whichever way it is, and they get the message to Harrisburg, and in Harrisburg they either press a button or pick up something or maybe they drop something and then they get the message at Carlisle and Carlisle presses the button and they fire the siren on the firehouse. I said now after that siren fires, how long will it take you to notify the population? He said a day or two. Now this is what we are talking about as far as the Weather Service is concerned. I know my counterpart up in Garden City, a great man with NOAA, but I learned that the Weather Service put

the message out over the wires, but then something happened at the state level and got down too far. This is up in the New England states. This is a real problem. In the Susquehanna River Basin, you have the telephone communications, the telephone company, you have the Western Union. You have the Corps of Engineers' networks, you have the local police and fire, you have the Civil Preparedness Agency, and you even have the amateur systems. We in the Civil Preparedness Agency, being part of the Department of Defense, we have AUTOVON, which you know is the dedicated Department of Defense Voice Telephone System. We have AUTODIN which is the dedicated Department of Defense teletype system and we have the GSA system for communications to all Federal agencies; we have got lots of systems as a matter of fact. We have one system which is the National Warning System which is the one I am talking about in connection with Cheyenne Mountain. This consists of 2,000 drops across the nation that are located in all of the states. We have 27 up here in Pennsylvania that are monitored 24 hours a day, 7 days a week. Then we have another 600 that are monitored a less period of time than that; so we have 2,000 drops across the nation where in 30 seconds if all goes well, the message gets from Cheyenne to Olney to Harrisburg, but I am not going to talk about it from there.

Now we have to find ways of improving upon that system, and we are doing this. This is the largest party line in the world, 2,000. We have actually, I checked the record, based on the river basin, we have 25 drops in Maryland and the rest in Pennsylvania out of 78 drops between the two states. Now the improved effort in this respect, trying to find a way to augment this system and this is not being disrespectful to what has been said by NOAA because we work hand and glove with NOAA.

I know who is the hand and who is the glove, but we do work with them and it is our business when they give us the message that they get it where it belongs. We are working on a beautiful system down in the Commonwealth of Virginia where we have already got this NAWAS going on a miniature basis right down to the grass roots. Let me talk to you about this other system which as somebody said is an acronym. It's called a Decision Information Distribution System DIDS. We have spent 8 or 9 million of your money for research and development on this system and it works. We have a prototype at Edgewood Arsenal. That is the big transmitter, and across ten states here in the east we have about 500 prototype receivers, and we have another 1,000 bought. I can assure you gentlemen here that when we operationally deploy these, a large percentage of them are going to go in your river basin in Pen-

nsylvania and Maryland. I found the Pentagon had them scheduled to go to one state, I said I will decide where they go in my region. What I am talking about is a system which makes it possible. It is one way for the message to be given and be received by the receiver which at the present time, based on our working relationship with NOAA will be in public places. But this system will make it possible for a minimum of loss of time in getting the message out. Now remember here again, I am talking about nuclear, but the plus is all these communications systems that I am talking about are adaptable and flexible for natural disaster, and this is what we are in the process of finding ways to use them for. I think the end result prototype-wise on this system is 10 transmitters across the nation and possibly 40,000 points where we can get the message out on a natural disaster in 30 seconds.

Now we have the same problem that you speak of when you speak of the NOAA system, that we are not going to put the same message out to 40,000 points, so we are able to do this on the receiving end of being able to select the part of the country that the message is to go to. I was visiting with the county commissioners at Allentown, Pennsylvania, it was wonderful. These guys are really dedicated. One of them said, you know what we ought to do is be able to wake the public up at 3:00 in the morning, you know, just call it as a practice. I thought that was great, but I didn't think that the county commissioners would get the feedback that probably the mayor would. But if there is some way when we implement these other 1,000 receivers where we can check them out for a couple of years and we can, you know, carry out a flash flood simulation or real flood simulation. This is true the way we have to go and repeating something the Colonel knows real well. In any effort, particularly the military, or in long-range planning, it's about nine-tenths planning and one-tenth the period of time when the activity occurs and planning pays off, it's paid off many, many times. As a matter of fact, the time of Tropical Storm Agnes we had just had a meeting of all the 67 county directors in the State of Pennsylvania at Lebanon Treadway Inn. Many, after Tropical Storm Agnes, stated that if they hadn't been to this workshop, you know the staff college that we brought out to the grass roots, they would not have been able to perform as well as they did. I think this is about my message, ladies and gentlemen. You know, I'm reminded of a statement by a fellow by the name of Solomon. He made this statement in 10 BC. Without vision the people will perish. Thank you.

Comment - (Dr. Maurice K. Goddard)

That is the original salesman who sold refrigerators to the Eskimos. Mary Ellen would you like to present the assessment?

Comment - (Mary Ellen Barnes)

I am sure I cannot follow Mr. Bex's act, but I will give it a try anyway.

Emergency Measures - (Mary Ellen Barnes)

Assessment

Because of time limitation, the Commission staff has not been able to evaluate the many and varied emergency organizations and plans currently in existence through the Basin. We anticipate, however, that such a task might be undertaken within the next year in cooperation with other interested agencies and groups.

With the information that has been gathered so far, there does appear to be wide differences in the manner and degree to which emergency operational plans are devised and implemented. This is primarily due to the fact that more so than any other element in a flood damage reduction program, emergency measures are dependent upon the variability among human beings in terms of: 1) recognition of the need for action; 2) willingness to work together; and 3) personal commitment of time, energy and resources. The success or failure of local emergency measures is also a function of the cohesiveness of the community, the nature of its politics and its financial and material resources. The continuous initiative and commitment that is necessary cannot be legislated. These variations in the characteristics of human beings and of communities, and the constant turnover in population do not permit any simple assessment nor any fool-proof recommendations. A few general comments can be made. It is quite difficult to anticipate all the circumstances and needs likely to arise during a natural disaster such as flooding. This unpredictability and the lack of experience in dealing with actual disasters accounts in part for the incompleteness of and lack of coordination within some emergency preparedness plans. It is necessary, therefore, that the authority and responsibility for each task at the state, regional and local levels be made clear and definite. The conduct of evacuation plans and the position of necessary supplies will more likely be successfully accomplished if the lines

of authority have been previously established and are familiar to the people involved. One of the more important tasks is that of communication of information, particularly on requests for and transportation of supplies.

While many communities can manage to evacuate people from endangered areas, in many instances facilities and plans for providing large numbers of people with shelter, food, health care, clothing, etc., have not been clearly identified. Likewise, there are several good programs in natural disaster training and education. There are, however, simply not enough such programs ongoing throughout the Basin.

These general comments do not begin to satisfy the need for a more extensive and more detailed assessment of the current programs in this area. We are not at this time in a position to submit such an evaluation or to make meaningful suggestions for improvements. We, therefore, defer to the experience of Federal, state and local officials for their analysis of the current situation and specific needs.

Comment - (Dr. Maurice K. Goddard)

Thank you very much. Okay, come up here, Mr. Bex. I think I see one of the difficulties with the Civil Defense. You know we have fire drills in schools, we have fire drills in our buildings, but how do we get Harrisburg to go through a total flood control drill? That type of thing that you were talking about with the Commissioners over in Allentown would be an important asset and we do not do this. Are we trying to do more of that?

Comment - (John Bex)

I'm glad that you brought that up. As I told you I had an hour, I was giving you less than that. Actually we had planned in Pennsylvania this coming year, 10 of these simulations which can be flood, fire or whatever the community feels is the most likely thing to do. You mentioned education. I want to tell you a little story about that. Tomorrow morning I will be in the Pentagon with my boss and there with me will be Joe Rizzo. Joe is the brother of Frank. He is the Commissioner of Fire in Philadelphia, and he also is the Civil Defense Director. The point of my story is this. We had a little project going up there in Philadelphia last year where we funded a piggy-backing of Civil Defense education with the fire department, and you will be delighted to know that mostly they

talked about floods, tornados, they did not do too much on nuclear and I have got to straighten them out on that because that is the way we get our money. They did this all year and today in Philadelphia, three times a day on the playgrounds in Philadelphia, the kids are learning about floods and tornados each day. Isn't that beautiful? The fire department, the backbone of services in a lot of communities are doing this. Just a form of education. Yes ma'am.

Comment - (Unidentified Person)

---just a few comments, I would like you to know I feel better that you are on the job.

Comment - (John Bex)

Thank you, what is your address, I will send a check.

Question - (Unidentified Person)

What about the possibility of getting existing groceries and supplies to high ground before disaster strikes, rather than waiting for emergency supplies to be trucked in afterward.

Answer - (John Bex)

Absolutely, I agree with you in total, didn't I say that your folk wisdom and common sense is what we needed more of in Washington. But let me make a comment on two other things that you said. You said something about the Red Cross and the Salvation Army; you should have included the Corps of Engineers, they understand the need and the importance of visibility. That is why they know about the Red Cross. Oh no, I understand that. You know it was 100 years ago that Lincoln said that government, the responsibility, the value of government was to do for people what they could not do for themselves. Now we have gone a long way on that pendulum, the government doing for the people to the point where people don't want to do anything for themselves. We have to move back the other way. The Federal responsibilities for disaster are vested in 27 different agencies. Isn't that unusual? Well, now the point I am getting at, there are departments who are looking toward the thing that you are talking about. The leadership comes from HUD in this particular area and

from OP which is now part of GSA that they have, and I cannot detail it because it is not in my bailiwick but they have plans and they are working with Federal agencies for this matter of food stuffs.

Comment - (Dr. Maurice K. Goddard)

The point I think she is making you know we have emergency hospitals, we have cots, we have blankets; they are talking about more day-to-day life things that perhaps were not easy to get a hold of, that is a good point.

Comment - (John Bex)

Absolutely.

Comment - (Dr. Maurice K. Goddard)

We have always tried to stockpile more critical issues, but not enough of the day-to-day issues.

Question - (Thomas Bresenhan-SEDA-COG)

When you go and visit the counties, do you actually go about preparing the plans dealing with the contingencies mentioned, food, evacuation routes, refuge centers, etc. Do you actually do that?

Answer - (John Bex)

To answer your questions, sir, we do too much of it and I would like to see us wean some of it, but yes we do, and we will continue to do it to get the job done. Well, what I mean is, to get them to know how to do the job themselves, because you must update plans constantly.

(Story about Louisville, Kentucky which illustrates the importance of local disaster planning)
---since the mayor was in California and the evaluation on the part of the Federal government found that there was no evacuation planned for Louisville, Kentucky. Now that was the responsibility of that community. After all, the mayor is the head of the harem, that is his responsibility, and so a call was placed to the mayor in California, and he got back because he was a great mayor, and they sat down and in 24 hours they had an evacuation plan. Since I brought up the subject, I will

finish it. The plan was that at 9:00 o'clock on a particular Saturday morning, they would evacuate this many blocks, 2,500 people would be moved out, and if it needed to be further than that, another 4,000. This was done by the mayor on TV. As I was telling some gentlemen at lunch, at 9:00 o'clock the busses and everybody were ready to evacuate those people, the people had already gone. Yes sir.

Comment - (C. Peter Carlucci)

You indicated in your presentation that you are working with state agencies. Here in the Basin we are involved with three states - New York, the Commonwealth of Pennsylvania and the State of Maryland. What particular state agencies in those three states do you work with?

Comment - (John Bex)

Let me say that this matter of civil defense as we think of it is a team effort. We think of civil defense not as somebody who takes over, but it is local government in action in time of emergency. So our direct relationships day-to-day are with the State Council of Civil Defense, headed by Dr. Gristell here in Pennsylvania and he does the working with the state agencies. If I led you to believe that, that is incorrect, because I work with the Federal agencies for the most part.

Comment - (Dr. Maurice K. Goddard)

The other two states must have similar agencies.

Comment - (John Bex)

Absolutely.

Question - (Unidentified Person)

You do not cover New York State?

Answer - (John Bex)

No sir, that is a pleasure that I do not have. I remember talking with Governor Rockefeller when he was here.

You know we had him here in Cumberland County. We really move out with some of these political guys who get in the limelight, whether it is Rockefeller or Ford, isn't that right, Mr. Masland. I said to Governor Rockefeller, we have a mutual friend, my old football coach, and I said to him, "why did you drop Civil Defense?" He said, "we made a mistake." You know they had a force of a hundred or two hundred in Civil Defense and they cut it all down, and then along came the tropical storm, it has been building back up ever since.

Comment - (Dr. Maurice K. Goddard)

Thank you very much. Any other questions? If not, Mr. Bielo will summarize the several topics of discussion then we'll have our general question period.

Summary - (Robert J. Bielo)

Before I start the summary, I might say on behalf of the Commissioners and our staff that we want to thank all of the people in the audience for joining with us and for their comments here today. We also would like to give our special guest speakers a little token to express the Commission's appreciation of the contribution each made here today.

The first topic discussed concerned the need to delineate flood areas - to map them so that we know with some degree of accuracy where flood waters are going to inundate developed land. From what has been presented today by the Federal FIA representative, our Basin is well ahead of the rest of the country in the number of studies that we have completed and have underway at this time. It is regrettable that 53% of the communities that are flood prone in the Basin have not applied to be included in the FIA program. This lack of community participation is tragic and indicates an urgent need to get more communities into the program. Certainly we can expect there are going to be floods in the future and there is no question that the folks in these communities are going to want help and financial assistance to relieve them of some of the burden of flood damages. Unfortunately, residents of towns and villages that have not enrolled in the FIA program will not be eligible for the kind of help that they could have. Currently 20% of the communities that have been declared eligible for the FIA program are covered under mapping contracts. While this rate of accomplishment is rated as good, it is not good enough, especially when we note that it is going to take us about 10 years at current funding to finish the mapping for the remaining communities. The key item presented to us today is that the funding for FIA study work has been increased from \$46 to \$75 million. It therefore is important for all of us to get busy and start lobbying for funds to complete the work in our Basin.

The second topic covered the Corps Basinwide Flood Control Review Study and the development of a basinwide mix of structural and nonstructural projects to reduce future flood damages. This is a tough topic and one that is bound to be controversial. Colonel McGarry advised that as part of their study, they have updated the damage curves to enable an accurate projection of the dollar cost of any given level of flooding in the Basin. Flood proofing studies have been completed and while it appears this type of damage reduction measure is quite costly for residential structures, it has merit for certain commercial and industrial application. Under the program, the Corps

is considering the feasibility and cost of relocation of existing development out of flood hazard areas. This is a difficult topic to discuss, however, when we recognize that many people have suffered repeated flooding, relocation may be an acceptable solution to the problem. Certainly the more we know about that topic, the better chance we have of addressing and applying it.

The Colonel also indicated that they are developing studies of systems of flood control measures. This too is a controversial topic, but sooner or later in any program someone has to make sacrifices that many can benefit. Thus, the Corps' study covers many areas and involves many special aspects of the problem of reducing future flood damages. Obviously, when this study is completed, it will be necessary to bring all the pieces together to provide a series of choices regarding the actions we can take to reduce and prevent losses from future floods. Then we must work to produce a plan that we can support and implement. If the involved people withhold support or refuse to accept any level of sacrifice to improve the overall lot of a larger area, the opportunity for future flood damage reduction will be seriously limited. An important facet of the plans and programs our speakers have discussed today is to assure that these diverse programs are put together on a basinwide basis and implemented. This basinwide approach does not deny or in any way present opposition to the state level programs in New York or in Pennsylvania. Actually it would be supportive of such efforts; however, neither state has the responsibility or authority to extend its flood control planning up or downstream over its borders into the adjoining state. This is where the Commission comes into play. The Commission has the responsibility and authority to coordinate Federal and state studies and interests to assure that any plans developed are compatible. It is not the Commission's role to tell the states and the Federal agencies how to do things, but to see what they plan and propose to do serves the broadest possible interests.

The next topic was flood plain regulation. I thought this was going to be the toughest subject to discuss; however, Keith Muckleston certainly handled the topic well. His candor opened some doors for us regarding the many difficulties confronting government agencies, especially when they must work on a consensus basis with a large number of other agencies.

One point that has received increasing emphasis is that the regulation of flood prone areas is one of the keys to reducing future flood damages. The government and the states cannot build dams on every stream and they cannot

be expected to construct levees around every area when there is a flood hazard. There must be acceptance of some responsibility at the local level to regulate land uses in flood prone areas. It's as simple as that and it's as difficult to accomplish as it is easy to express.

Local governments have long had the responsibility and authority to regulate what happens in flood prone areas within their jurisdiction. Until recently, only limited use of this local regulatory authority has been applied to flood prone lands. Obviously, it's difficult for the local officials to oppose tax and job producing development of flood prone areas when traditionally we have looked to protection of these areas rather than to avoidance of these areas.

State governments also haven't moved very fast in trying to obtain legislation to deal with flood plain regulation. But in the wake of recent flood disasters, many states now are actively seeking such legislation. In our Basin, New York State already has a flood plain regulation law. Pennsylvania expects to pass flood plain legislation this year. Maryland is working toward such legislation, and now our Federal government is moving to develop a national policy on flood plain uses. From what we've heard today, the draft policy is started in the right direction but apparently needs a bit more shaking down, some clear cut assignments of responsibility and recommendations for corrective legislation.

Our fourth topic was Expansion and Improvement of the Flood Forecasting and Warning System. I believe we can all agree that from what Mr. Flanders has presented, the National Weather Service is well advanced in making vast improvements to its system. It seems again that our Basin is well ahead of most other areas in the country in terms of existing forecasting capabilities and in planned new programs.

Certainly the flood forecasting program is an area where there is ample evidence of good cooperation among Federal and state agencies. The USGS has been updating old stream gages, adding new gaging stations and proceeding with extensive experimentation on satellite and other forms of automatic data transmission. Their program fits closely with the National Weather Service efforts to provide an increased number of data collection points in the river system, to add automatic data recording and transmission equipment and to relieve the forecaster of many routine duties, thus enabling more direct effort on the actual forecasts and dissemination of warning information.

With all the improvements planned, there remain problem areas on small watersheds not covered under main stream systems. There are many communities located between forecast points in need of some means of relating reports of upstream areas to their own situation, and there is the continuing problem of getting the broadest possible dissemination of forecasts and warnings. While these problems remain with us, they are manageable and we can look with considerable assurance that our overall system for forecasting floods is good and is being improved upon rapidly.

Our last topic involved emergency preparedness. Certainly, it's a tough job to stay on the alert for years without losing interest or enthusiasm. However, after hearing John Bex and experiencing the high level of enthusiasm he projects, I believe we are in good hands.

Preparedness apparently is not a very strong trait in most of us as we seldom have that extra fuse when we need it, or rarely can find a ndw washer around the house for the hose when it starts to leak. These little problems are easy to overlook, but it is another matter to lack preparedness when we are dealing with protection of lives and our properties. Preparedness for flood emergencies is a serious and complex matter. It deserves attention and support from all of us. We can't take emergency preparedness in a lax, uncaring way. We need to show our interest to attract competent, energetic and enthusiastic people to lead and man our civil defense and emergency planning and operational units. The more interest we show the better will be the plans and the programs to meet the next flood emergency.

That completes my summary comments. I would note that we will prepare a complete transcript of today's proceedings and provide a copy for each person who has signed our register. Copies also will be available on written request to the Commission. We do plan to make contacts with the regional planning boards that have expressed interest in today's program topic to obtain their views and suggestions for incorporation into overall recommendations for Commission consideration in planning future activities to reduce flood damages in this river basin. Thank you.

Comment - (Dr. Maurice K. Goddard)

Thank you, Mr. Bielo, very excellent summary. On behalf of the Commissioners, I want to re-echo Mr. Bielo's thanks to the speakers and our own staff members who participated in this presentation. This is the first time we have attempted this type of program and I think you can see it

has much merit. It's an educational process even to many of us who have worked in this area for many, many years. We're most indebted to the people who did participate. Our next meeting will be held not in August, but in September in Annapolis, Maryland. The date is Thursday, September 4th at the Annapolis Hilton Inn. There will be public notice of the meeting. It will start in the morning at 9:00 a.m.

Comment - (Robert J. Bielo)

There will be an afternoon field trip to the Corps' Chesapeake Bay Model located at Matapeake, Maryland.

Comment - (Dr. Maurice K. Goddard)

How many can be invited for the field trip?

Comment - (Robert J. Bielo)

I believe the Corps can accommodate any number of people who want to visit the model. We will have directions to the model available at the meeting.

Comment - (Dr. Maurice K. Goddard)

I think it's safe to say it is the largest model of this type in the world - the building covers about 14 acres. One other point I'd like to make, the Guidelines for Stream Clearance Restoration have been published and there are copies available on the back table, if not, write to the Commission if you want a copy. If there is no other business or remaining questions, I will call for adjournment of this session.

Moved by Commissioner McKee, seconded by Commissioner Webster and moved to adjourn at 3:35 p.m.

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NAME	TITLE	ORGANIZATION OR ADDRESS
John K. Robb	R.B. Study Staff Leader	SCS
James E. Garling	Associate	Erdman, Anthony, Assoc.
Ernest U. Gingrich		Michael Baker, Jr., Inc.
Robert DeVini		Michael Baker, Jr., Inc.
Richard F. Perrine		Michael Baker, Jr., Inc.
Alan Dysleski	Senior Planner	Luzerne Co. Planning Comm.
John E. Bex	Regional Director	DCPA, DOP
Frank J. Dwyer	Program Coordinator	N.Y. State DEC
Winston Inwald	Engr-in-Charge, RB NYRO	Federal Power Comm. - N.Y.
Richard L. Altemore	Adm. Assistant	Representing Senator Moore
James B. Hood, Jr.	Hyd. Eng. Tech.	U.S.G.S., Ithaca, New York
Mary P. Brown	Planning Analyst	Capital Region Planning and Development Agency
Edward R. Lewis		Macomber Assoc., Inc.
George Errick	Chief Civil Engineer	Berger Assoc., Inc.

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NAME	TITLE	ORGANIZATION OR ADDRESS
Beverley Stolarski	Secretary - Energy Parks Study Council	R. D. #2, Box 151 Troy, Pa. 16947
Eugene Roden	Planner	Tri-County Regional Planning Commission
John B. Mochel	Asst. to Ch. M.E.	Philadelphia Electric
Bob Slaff	President	S.R.B.A.
Paul Tweedy	SRBA - Ex. Dir.	Wilkes Barre, Pa.
Richard Altman	Legislative Assistant	Congressman Flood
Robert S. Yates	Chief Comm. Planner	Lancaster Co. Planning Commission, Lancaster
Halbert Hileman	Vice Chairman	Upper Unadilla Valley Assoc.
Elizabeth Rice	Executive Director	Lock Haven Redevelopment Authority, Lock Haven, Pa.
Elizabeth G. Tamsett	Eastern Susquehanna Watershed Association	S. New Berlin, New York
Howard L. SOFF	Upper Unadilla Valley Assoc., Pres.	R. D. #2 West Winfield, N.Y.
Rita C. Ardner	Lock Haven Redevelopment	Lock Haven, Penna.
Robert K. Mowrer	Director Lancaster Co. Cons. Dist	204 Laneview Dr. Willow Street, Pa. 17584
Jan C. Phillips	P P & L Project Engineer	2 N. Ninth St. Allentown, Pa. 18101

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NAME	TITLE	ORGANIZATION OR ADDRESS
Paul LeMenager	P P & L Engineer	2 North Ninth St. Allentown, Pa.
Mr. Beamer	Dist. Chief	U.S.G.S. Harrisburg
E. E. Council	Hyd. Engr.	Pa. DER
Henry H. Haskman	Ex. Assistant	Lanc. Co. Cons. District
Bert Daniels	Bldg. Inspector	Kirkwood, N.Y.
James G. Brandon	Planning Analyst	Pa. DCA
Danne Stuemphle	City Council	Lock Haven, Pa.
Mrs O. Feese	Hydrologist	NWS RFC Harrisburg
D. D. White	Hydrologist	NWS RFC Harrisburg
G. Kapko	Hydraulic Engineer	Pa. DER
Robert M. Sharlin	Assoc. Planner	Bureau of City Planning Harrisburg
Michael Prest	Engineering Aide	Gannett, Fleming, Corddry and Carpenter, Inc.
Biff Elicker	C.E.	" " " "
Charles Cramer	Draftsman	Juniata County Planning Commission

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NAME	TITLE	ORGANIZATION OR ADDRESS
Tom Bresenhan	Planner	SEDA-COG
J. E. Anderson	Licensing Engr.	GPU Service Corp Parsippany, N.J.
Sam McCune		
R. P. Adams	HEV	DER - Harrisburg
Roger Carrier	Sewer Engineer	Dunn Geoscience Corp
Maxine Woufering	Asst. Attorney General	DER
Ruth Barland	Legal Assistant	DER
Bill Conn	Senior Planner	York Co. Plng. Commissio York, Pa.
A. Karplus		SRBC
G. Lazorchick		"
G. Senko		"
John P. Phillips	Ecologist	PennDOT-Office of Env. Q 1209 T & S Bldg., Hbg.,
Ming C. Tsai	Hydraulic Engineer	PennDOT - Bureau of Desi 1113 T & S Bldg., Hbg.,
Robert G. Decker	Planning Dir.	Snyder Co. P.C.

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NAME	TITLE	ORGANIZATION OR ADDRESS
land V. Page	U.S.G.S. Hydrologist	Harrisburg, Pa.
K. Houser	Construction Mngr.	Hershey Park Hershey, Pa.
G. Faul	Engineer	Hershey Estates
R. Embich	Env. Proj. Leader	Hershey Foods Corp
My O. Bradley		Patriot-News, Harrisburg
ennis Grove	Planner	Lycoming Co. Plan. Comm.
F. Yeh	Project Manager	Gilbert Assoc., Inc.
ed Wertz	Research Analyst	Pa. Dept. Agric. 2301 N. Cameron, Harrisburg
cholas Barbieri	Corps of Engineers Flood Plain Mgt. Br.	Phila. District Corps of Engineers
Gry Rohn	" "	" "
ert Lehmans	Pa. DCA	South Office Bldg., Hbg.
R C. Richert	Water Resources Eng.	GPUSC
Robert J. Blair	Director	Lower Tioga Council of Governments
Gry Smith	Engineer	Spotts, Stevens & McCoy

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NAME

TITLE

Wayne R. Grube	Soil Conservationist	SCS - Harrisburg
Jim Mays	Agric. Economist	SCS - Harrisburg
Taylor Morgan	Engineer	SCS - Harrisburg
Wm. McMillen	Member W.B.V.F.C. Assn.	Box 282 Jersey Shore, Pa.
Elizabeth T. Garlick	Secretary W.B.V.F.C. Assn.	R. D. #1, Box 31 Lock Haven, Pa.
Jocelyn H. Winner	Secretary West Branch Flood Control	221 W. Water Street Lock Haven, Pa.
Doug Blankinship	Land Use Coordinator	Lackawanna County Planning Commission
Pat Carr	Land Use Planner	" "
Holly C. Stambaugh	City Planner	City of Lancaster Pennsylvania
Wm. Schoonhoour	P P & L	Allentown
Judith H. Johnsend	Environmental Colition on Nuclear Power	State College, Pa.
L. Carlin	EDCNP	Avoca, Pa.
Myron H. Crouch	Steuben Co., N. Y.	21 E. Morris St. Bath, N.Y. 14810
Richard Yingling		Heidelberg Planning Comm

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